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REMARKABLE MINE OUTPUT RECORD.

A CHALLENGE TO THE WORLD.

The Pennsylvania Anthracite Mines offer probably the best examples of great output that have ever been put on record, and among these notable examples the Nottingham shaft of the Lehigh & Wilkesbarre Coal Company has long maintained a leading position.

The anthracite beds in Pennsylvania are so large there is practically no limit (except in convenience in handling), to the size of the mine cars; many collieries make them to hold 100 cubic feet; those at the Nottingham mine are in inside clear dimensions 7 feet 5 inches long, by 3 feet 7½ inches wide by 2 feet 10 inches high or have a capacity of about 70 cubic feet, which as the coal comes from the mine would give a weight of about 4000 pounds. As the cars are piled the weight of material raised would probably average very nearly two gross tons to the car. At all the anthracite mines only one car is raised at a time on the cage. The Nottingham shaft has a double hoistway and is something over 300 feet in depth or including the pit head perhaps 400 feet.

In the month of Jauuary the colliery worked 18 days and 8 hours, and raised from this shaft, as the average per day of 10 hours, 1181 cars, or let us say 2360 gross tons of coal and waste. This is equal to 118 cars, or 236 tons an hour, or *nearly two cars hoisted each minute*, as the average working rate through the month.

Since there are two hoistways, this means that each cage made the round trip, say 800 feet, and changed cars at the foot and at the head of the shaft in the average time of one minute, through the full ten-hour day, every working day in the month.

We shall be pleased to hear from any mine in any part of the world that has done as good work.

A FEW OF OUR EXPORTS.

During the year 1888 the United States exports of domestic merchandise aggregated in value no less than $679,614,181, made up as follows:

Agricultural Products	$491,397,873, or 72.31 per cent.
Mining Products	19,897,544, or 2.93 per cent.
Products of the forest	24,865,283, or 3.66 per cent.
Products of the Fisheries	6,732,512, or .99 per cent.
Miscellaneous	3,942,393, or .58 per cent.
Manufactures	132,778,576, or 19.53 per cent.

It is interesting to note that while the value of agricultural products exported last year was much less than in 1887, owing chiefly to lower prices of breadstuffs, the value of manufactures and of mining products increased materially.

A study of the items of these statistics shows where we send our chief exports, though much of what is sent to Great Britain is really destined for other markets, and goes via England because under our absurd shipping laws our merchant marine has been almost destroyed.

The Argentine Republic is far the largest purchaser of our agricultural implements, having taken in 1888 nearly $900,000 worth out of a total of $2,759,615. Australasia and Africa are also good markets. Even France and Germany buy our admirable implements. Flour, wheat and corn are of course very important items in our exports, the West Indies, Brazil and British North America, after Great Britain, being among our best customers.

Cotton and manufactures of cotton amount to nearly $236,000,000. Europe takes nearly the whole of our exports of raw cotton, while China and South America are the heaviest purchasers of our manufactures of cotton.

Sewing machines were exported to the value of more than $2,000,000, of which Europe took the greater part, showing that in the higher class of machinery, where one would expect the labor item to be most important, we are able to compete with the so-called "pauper labor" of Europe. The fact is our mechanics accomplish more in a day's labor than do their rivals in Europe, and there are few products of labor here that cannot be produced as cheaply, so far as the labor item is concerned, as in Europe.

The West Indies, Central and South America and Australia were large purchasers of steam engines, the total exports of which amounted to $7,626,396.

Among our most important items of export are bacon, lard and hams, and these we send to European countries, to the West Indies, Central and South America, to Australia and other parts.

Our exports of furniture, of lumber in various stages of manufacture, of railroad cars, of carriages are steadily increasing, and will continue to grow in favor as they become better known to the inhabitants of foreign countries.

THE PIG-IRON STORAGE WARRANT SCHEME.

This proposed method for storing and incidentally for promoting gambling in pig iron has not met with much favor among those interested in the iron trade, and the attention which has been directed to its general bearing and its similarity to the Standard Oil pipe-line certificate plan has apparently diverted much of the favor which some of its other features were calculated to attract.

The official programme and arguments used by its promoters commence with a reference to the great success in Great Britain of the Scotch pig iron warrant system. It is, of course, well known to those in this country who are familiar with Scotch warrants that the system has been very far from a benefit to the iron trade there, that in fact it has proved a great injury to it, but it may be well to cite the opinion of the London *Ironmonger* which speaks with authority on this subject. In its issue of February 9th, referring to our storage warrant "Trust," it says :

"The question of storing pig-iron on the warrant system being a novel one in the States it is exciting a good deal of interest there, but it is rather amusing to find that the plan is started on the system which 'has been in *successful* operation in Great Britain for many years'! To use American slang, this statement makes us 'smile,' and we are impelled to ask exactly where the 'success' of the British warrant stores comes in. We admit that the 'success' at Glasgow has been so great that the Scotch pig-iron trade is saddled with considerably over one million tons of iron in the stores; but we are not aware that the British iron-masters regard that vast pile as being much of a 'success' for them. From their point of view it is chiefly 'successful' in enabling 'bear' gamblers to depress the price of pig when it suits their purposes to do so. If the furnace owners of the United States are desirous of 'giving themselves away' in a similar manner they will heartily support the new American warrant stores; but if they wish to retain full control of their own product, and mean to maintain the quality of their pig, they will be wise in declining to accede to the proposals of the managers of that project."

Many efforts have been made here and in Philadelphia to establish the storage warrant system, and thus far with uniform non-success. The importance attached to this latest plan is due to the responsible names attached to it, and to the intimation that Standard Oil Co.'s influence and workers stand behind it to popularize speculation in the warrants just as in pipe line certificates, which have become a favorite gambling medium. Unquestionably, the effect of storage warrants upon the quality, and eventually upon the price of pig iron, would be injurious.

This plan would make a market for the irons too poor in quality to find purchasers for consumption, and the accumulation of these grades would eventually pull down the prices of better irons that seek an open market. The gentlemen who have lent their names to the scheme are, for the most part, quite ignorant of either the making or the selling of iron, and though their names contribute dignity to the scheme, they add little to the stability of its foundation or to its chances of success.

We all remember the high names announced and the loud trumpeting of their weight and influence in making a success of the silver bullion certificates, a kind of silver storage warrants, which were issued here in July, 1887, by the Western National Bank, and which we were told would immediately produce vast and beneficial effects on the silver markets of the world. The certificates were engraved in the finest style of the art, and, we believe just five sales or resales aggregating 170,000 ounces of silver were made. The entire scheme was a flat *fiasco*—the eminent names could not avail. That a greater degree of success awaits

the Pig-Iron Warrants is probable; that they will ever become popular gambling chips is doubtful. That the establishment of warrant yards, as proposed in this plan, will prove a convenience to many furnaces is undoubted; while it seems equally certain that the ultimate result of large stocks of the poor iron which will seek the yards will prove very injurious to the iron trade as a whole.

DIVISION OF LABOR IN SCIENTIFIC AND TECHNICAL WORK.

What is the "coming man" of the twentieth, the twenty-first, and succeeding centuries to do when he tries to cover the general range of knowledge as then understood? Some one has said that the true secret of education is to acquire a pretty thorough insight into one small, limited branch, with a superficial smattering of all others. Is this to be the idea of a complete education, or at least that which is within the compass of our poor average intellects? Or will posterity have to split up into groups having a smattering of one subject, and a something less, as yet unnamed, idea of things in general? There has been such a rush of progress during the nineteenth century that the specialists have had to subdivide themselves, after the fashion of certain protozoa, into other, but not lesser forms. To change the metaphor: The varieties of to-day become the species of to-morrow, and these in turn dissolve into sub-varieties indefinitely; but each fraction being about equal to its immediately preceding whole. There is a certain limit to the capacity of the average (and perhaps similarly of the highest) mind, which in its growth, is certainly not now keeping up with the multiplication of known facts and ideas. In olden times, as can be traced by the records, the power to discriminate and to classify seems to have been in advance of the ability to observe.

Here is an old story in point, illustrating existing conditions: A certain man, a sort of scientist after his fashion, found an insect which in his crude way he could at once determine to be a beetle. But he wished to know just what kind of a beetle that particular one happened to be, or in other words to find out its name. So, like a good and patriotic citizen, he referred it to a specialist—just as a sensible mining engineer with a broken leg would call in the advice of a surgeon. He went to a friend and said:

"Here is a beetle. Now you are an entomologist; please tell me what this is."

"Oh, no," said the referee, "I am not an entomologist."

"Not an entomologist? Why I thought that was your line."

"No: I only wish I were," he said, sadly.

"Well, what are you? What do they call a beetle sharp—a coleopterist?"

"No," said he, modestly and with a deprecatory air, "no, I'm not a coleopterist. If you insist on knowing, I might claim [now brightening up] to be a scarabæist; that is, you know, altogether different from being a regular coleopterist."

It is not so long ago that a single great mind, like that of Humboldt, could take in at a single comprehensive glance almost the sum of human knowledge. There can be no Humboldt now. We have only compilers. If we go further back, we find the process to have been simpler, though not so simple as our common text-book information of to-day might lead us to infer. But for the future—must it be growing harder, year by year, to reach that "smattering?" It seems bad enough now, when twenty years at least, or a term about equal to the active working life of a man, must be spent in simply obtaining a start, a rudimentary knowledge, to which all the years of experience have to be added before that start becomes productive movement.

There is an alternative supposition. Once in a while some master thinker arises, who, by collecting a mass of apparently isolated and incongruous facts, masses them into a generalization, an idea which in its entirety can be grasped, though the assimilation of the component parts is beyond us. Then it is wondered why so simple a thing was not self-evident before.

It was only lately not such a difficult matter to become a fair electrical engineer; that is, as the average of electricians would then run. See how this one subject of electrical engineering has been subdivided, so that out of the half dozen or more classes of present specialists in electricity and its applications, the members of each class have hard work to keep up with the news of the day and at the same time attend to their own practical work.

Take mining engineering. Theoretically, a mining engineer is educated in each branch of his profession. But when he assumes the management of a great mine, he is neither a prospector, miner, machinist, surveyor and draughtsman, assayer or metallurgist. He has not time to do all things, and if he had, the chances are that for each specialty it would be easy to find some one who could do that particular work as well or better than he. Not that he need be reduced to the ranks of the smatterers. It is just as important to judge of the color of sharpened drill-bits, the setting of boilers, the running of pumps, the sampling of the "face," the accuracy of surveys and of the assays, as if he had personally to do all these things and a thousand others, including the preparation of a satisfactory weekly report to the home office.

Few people have a very definite idea of what the work of an astronomer is. Perhaps, to the general mind, it means a kind of nightly inspection of the infinite heavens, with a summary of results. The cold fact, however, is that the real work in this department is just as prosaic as the making-up of a standard solution for a blast-furnace laboratory.

Everything is subdivided. There are greater and lesser astronomers, of course. But they all are of necessity specialists, and in their real work, the work which tells, they usually settle upon one set of instrumental observations. Some make a specialty of comets, some of asteroids, some of solar spots, some of mapping, and so on. It is not hard to compile a popular treatise on astronomy, but the actual working results are, after all, those of specialists.

Or, take as another example, a fully equipped geological survey. Is there any one man living to-day who is in truth a general geologist; that is, a combination of field geologist, economic geologist, stratigrapher, lithologist, mineralogist, chemist, physicist, paleontologist (who is now either a paleozoologist or paleobotanist studying certain limited horizons), topographer, with an indefinite extension of titles indicating a subdivision of work ranging between cosmology and microscopy? Any one of these branches indicates a wide and growing field.

In a watch factory it is more profitable to distribute the kinds of labor and of machinery to the last degree, so also it is found expedient to subdivide labor in every branch of scientific and technical work, precisely as in purely mechanical operations.

Only what is the "coming man" to do about it, if he aspires to a liberal education? And, more especially, what view will the coming schoolboy and his pedagogue take of the situation?

EXPORTS OF AMERICAN MACHINERY.

The ENGINEERING AND MINING JOURNAL has preached so often and so earnestly upon this text—the necessity and advantages of occupying a wider field for American machinery in foreign markets—that we are glad to note that these efforts are having a salutary effect, though not yet by any means to the degree which should be reached. At the risk of perhaps tiresome iteration, which, however, is pardonable, in view of the extreme importance of the subject, we again recur to it. Foreign buyers have fully as great an interest in securing the latest and best appliances as our manufacturers have in extending their sales.

It has been generally acknowledged during the last quarter century that in special directions American machines were unrivalled; and the particular points in which they have been, and are to-day, known to excel are ingenuity, lightness and a high grade of workmanship. So far as these qualities go there has never been a question, and buyers abroad have been willing to pay a *higher* price than for other makes in order to secure them.

But of late years there has been a marked change. While still commanding the old fields, a great advance has been made, and the progress is going on in a rapidly increasing ratio. Very many specialties have been added, and in the general range of machinery a larger export output has been attained. We do not now have to rely upon the old plea of "Yankee smartness" alone; but can compete in foreign markets fairly and squarely on the ground of cheapness in first cost as well, for a great variety of products. But, even where the first cost is actually higher, if the results gained by any given machine are in the long run better, that machine is more economical than an apparently cheaper but actually less effective one. This trite truism is one which it is not always easy to instill into the minds of prospective buyers, strange to say, though there is an advance here also. But, as we have said, our manufacturers are not now obliged to depend upon excellence of design and good workmanship alone. They can go into the open market for a vast range of articles on the ground of primary (or first cost) cheapness. The simple reason is that not only are our methods, processes and appliances developing at a more rapid pace, as a whole, than those of foreign countries, but our raw materials are becoming cheaper.

A glance at the list of advertisements in the present export edition of the ENGINEERING AND MINING JOURNAL will show, to a certain extent, what a variety of types and styles are now offered to, and called for by, foreign buyers. Without making special mention of any of them, but merely as a brief and partial resumé of our machine exports, let us note some of the articles at present going abroad.

In all branches of electrical, electro-magnetic, and acoustic appliances and plant (that is, taking them all together), the American productions have a decided superiority. For some of these branches home inventors have agencies and installment establishments abroad, and of course the important ones are invariably secured by foreign patents, in which case they may, or may not, be represented by foreign manufacturing companies. Yet, for the larger number of recent inventions, the home country is the principal supplier. Arc and incandescent plants for lighting, telegraph, telephone and some other applications are, of course, old

Now the specialties are the applications of electricity for power, both in generating and transmitting and in the ultimate motors. This applies in a wide series of uses, among which the applications to mining, as in underground haulage, pumping, ventilating, etc., are now attracting, perhaps, the most attention. In acoustics, there are the phonograph and graphophone, both now practically introduced. There are several important systems of surface transportation by storage batteries, and by overhead or underground connections, which are now practically at work, and have proved commercially successful. A feature of the plants for all these purposes, as well as for others to be mentioned below, is that the complete rig can be ordered in this country, designed, furnished and installed, instead of ordering parts simply, to be put together at the places where used. There are also many of the prime materials of electrical and acoustic apparatus, such as pure copper, and fine insulated wire, which can be supplied.

Mining machinery of all kinds has been for many years largely shipped abroad. Complete outfits are usually exported; but, besides, there are separate items, such as diamond prospecting drills, two of which, a correspondent writes us, were recently cabled for from the Transvaal; ordinary percussion drive-well apparatus, machine drills, worked by steam or compressed air; hoisting engines of all types; flat and round steel cables, cages, self-bailing tanks, safety-clutches; steam, Cornish, compressed-air, and hydraulic pumps, donkey and "baby pumps," etc.; compressors and blowers; mine cars and tracks; hand mining tools, etc. Hydraulic plants, complete, have been made for many countries in South America, Mexico, Central America, and Australia—and, in fact, for every part of the world where "hydraulicking" is practiced on the large scale. There is also an opening for coal-mining machinery, breakers, and washers yet to be filled.

In most departments of metallurgy preëminence is claimed for the American designs, and complete outfits, usually going with the mining plant proper, are being exported, mainly to the countries above named. It is a great advantage to a mining company beginning operations, or re-opening old mines, or increasing their plant, to have the entire plant designed in harmony. The local engineer, after consulting with the constructing designers, can secure a more compact and evenly-balanced whole than by ordering parts separately. Our large mining-machinery works make a point of sending their own men to supervise the setting up. The leading items are rock breakers, rolls, pulverizers, steam and gravity stamps, with their complement of parts, of which the steel shoes and dies deserve mention; screen cloth and mechanical sizers; a variety of concentrators; pans, settlers, agitators and their connections; roasting, chloridizing and smelting furnaces, of which the American water-jacket is a favorite; amalgamated silver-copper plates; electrolytic plant; assayers' supplies, and a long list of sundries.

For motive power in general, it would be impossible to mention even a small proportion of the American specialties. But notice should be given to the safety and high-pressure boilers; the petroleum, caloric and compressed air engines; high-speed engines for special purposes, as for driving dynamos; turbines and impact water-wheels, with the small water motors; portable and donkey engines, etc., etc. Overhead cable haulage, now being so largely introduced here, can be readily supplied for foreign needs.

The exports of transportation machinery go on as usual. Standard and narrow gauge railways, with all their extensive rolling stock and fixed appurtenances, can be furnished from this country to many others in fair competition. Light lines for steep grades and for temporary and removable purposes are a specialty. The long American passenger cars are being adopted abroad in greater numbers, and it is notorious that all the improvements, such as the parlor, dining, and sleeping cars, which make traveling a luxury, have taken a firm hold in foreign countries.

Wire-rope tramways are also being sent to many countries, largely, as in other things, owing to the information concerning them furnished in these pages.

A number of important iron and steel bridges have been supplied abroad in the face of sharp competition, and their designs and workmanship are highly approved.

We think there is a considerable field, yet unoccupied, for architectural iron-work.

It is hardly necessary to revert to the many forms of light machinery, labor-saving devices and "notions," which have so long been popular abroad.

Fire-arms and ammunition, sewing-machines, cheap watches and clocks, and the innumerable small articles which are here made with interchangeable parts, and whose manufacture on the large scale with division of labor has proved so successful, are among the articles which gave the start to our heavy exports of manufactures in the face of cheap foreign labor and long established industries, and it may surprise many to learn that we are actually sending pocket knives to Sheffield, England.

We do not, unfortunately, build ships for export as a regular business, but we do export a variety of ship's fittings and small machinery As to yachts and their fittings—but we forbear.

If one should attempt to enumerate all, or anything like a large proportion of the kinds of machinery which are, or should be, going into foreign markets, he would find it a difficult task, and the result might be about as interesting as the famous catalogue of the ships in the Iliad. Even our advertising columns would supply a long list of additions to the very casual glance just taken. But we cannot too often insist upon the notice of our manufacturers the desirability of pushing their trade outside of home markets. In some cases it may be suspected that a failure to secure a foothold abroad has been due to a lack of energy rather than to ordinary trade conditions.

If we export a good deal of machinery, we also are exporting that which makes or calls for it—the talent which designs, constructs, and uses it. While our growing exports of civil, mechanical, and mining engineers might from a narrow-minded standpoint be deplored, it is a consolation to know that there are plenty left.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Wages of Coal Miners in Pennsylvania Anthracite Mines.

NEW YORK, Feb. 14, 1889.

EDITORS ENGINEERING AND MINING JOURNAL:

DEAR SIRS: I hand you herewith a table which has been prepared with some difficulty, but with great care, to show the *maximum* and *minimum* earnings of Pennsylvania anthracite miners. These figures are taken from the pay-rolls of a Schuylkill County colliery for the year 1888. It may, perhaps, interest some of your readers to know that, at the colliery referred to (which is probably as fair an example as can be found), the minimum rates given below are actually the ten lowest averages for the year. D.

MAXIMUM WAGES.				MINIMUM WAGES.			
No.	Days worked.	Total wages.	Rate per day of 10 hours.	No.	Days worked.	Total wages.	Rate per day of 10 hours.
1	237·3	$1,005.93	$4.23 9	1	243·1	$433.28	$1.78·1
2	242·4	1,011.86	4.10·4	2	237·9	435.29	1.82·9
3	246·5	853.57	3.46·2	3	233·	462 44	1.95·9
4	246 5	836 53	3.40·7	4	235·7	475.71	2.02·1
5	246 5	836.45	3.39·2	5	235·	560.82	2 13·1
6	247 3	836.98	3.38·4	6	234 6	523 10	2 22·9
7	245.5	815.02	3.31·9	7	234·6	526.93	2 24.6
8	245·5	814.99	3.31 9	8	235·4	531·64	2 25.8
9	246·5	814.60	3 30·4	9	233 4	528.60	2.26·4
10	246 5	760.37	3.08·4	10	243·	560.88	2.30·8

N. B.—The above figures are net—all powder and supplies having been already deducted.

Philadelphia's Export Trade.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Notwithstanding that during the month of January domestic business has been apparently quiet, and loud complaints have been heard from our local merchants in nearly every branch of the home trade, the year 1889 has opened with flattering indications of a brisk foreign trade, and the exporters of this city speak with confidence of the prospects in this direction for the current year. Dry-goods, machinery of all kinds, tools, railway supplies and house-furnishing goods, etc., are enjoying increased favor abroad.

Foreign dealers in American manufactured goods are sending orders larger and of wider range than formerly. Australian orders for goods to be shipped in March are already in hand. The merchants of Calcutta and Bombay, as well as the rice dealers of Corea and the coffee planters of Liberia, are negotiating for Philadelphia manufactured goods. Railway supplies are being sent to the Argentine Republic and Brazil, while Central America, particularly Costa Rica and Honduras are dealing largely here.

The recent twin launch of the dynamite cruiser "Vesuvius," and the gunboat "Yorktown," at Cramp's shipyard was a notable event, both in the history of our new navy and in the yard where the vessels were built. The shipyard of the Messrs. Cramp, which is doing so much to show that it is fully equal to the task of building good vessels, is the oldest and best equipped establishment of the kind in the country, having been started by William Cramp in 1830. It has built an immense number of vessels, and, in the re-organization of our navy, has contracts aggregating $5,000,000, or more than all the other private shipyards of the country combined.

We desire to chronicle the fact that recently a quantity of weaving machinery was shipped by Rothery, Davis & Co., exporters, of this city, via American line, to England. This seems like "sending coal to New Castle," but the truth remains that Philadelphia is fast becoming a great center of the manufacturing industry in textile machinery, as well as wood working, iron working and wool machinery. This shipment was the first of the kind ever sent out from the United States. The above firm will be pleased to show photographs and give particulars to any one who is interested in this line of machinery. It might be well to state that the machinery here referred to possesses several improvements not heretofore used. PHILOS.

PHILADELPHIA, Feb. 16, 1889.

Electric Railroad Brake.—The Lehigh Valley Railroad Company has just made practical tests of a new electric and automatic brake. An emergency stop brought a train of fifteen cars to a standstill within 680 feet, the speed of the train being 34 miles an hour.

THE TRANSVAAL, S. A., GOLD MINES.

[CORRESPONDENCE OF THE ENGINEERING AND MINING JOURNAL.]

I am passing through this place (Johannesberg) for the first time, but even I who have seen Western camps, am astonished, not only at the place but at the amount of business done here. So far as I know it is only beaten by Leadville and Virginia City. There is a good deal, and will be more, of legitimate mining carried on, and the output of gold, which now remains at about 30,000 ounces per month, is bound to increase—it may be to four or five times that figure. Roughly speaking, there are 35 properties here turning out gold, and as many more being opened up and erecting mills. There are, perhaps, now 2000 head of stamps dropping, and this will be increased to 5000 about—in some six weeks.

As you know perhaps, these properties are being worked on some four or five parallel beds of quartz conglomerate, which, I understand, have been traced for about 60 miles. These beds are interstratified with others of sandstone, and their width varies from a few inches to ten or more feet. I have no means personally of testing or finding out the average value of this conglomerate, but from all I can learn it never runs less than 8 penny-weights per ton, and from that to nearly as many ounces. One property here with ten stamps crushing for 325 days out of last year, has turned out over £92,000 worth of gold. I hear that they put through about 3 tons a day to the stamp, and that the average has been about 3¼ ounces per ton, also that most of this has been taken from shafts and drifts, and scarcely any from the stopes now being opened up. I have no means of ascertaining whether or not they do fair mining or only gouge out the richer portions, but in two cases at least they don't do this. I cannot, of course, tell whether or not this is likely to last for a number of years, but there is no reason why these beds should not extend downwards to any depth, though the deepest shaft is only some 130 feet on them. At any rate, the gold contents seems rather to increase in depth and the beds to maintain their width, though I may observe that the material from the deeper workings seems to become more like a breccia and less like a conglomate, indeed hand specimens can be obtained that are apparently a true vein-quartz.

These beds, though dipping generally to the south, do so at all angles from 20 to 90 degrees, the general average being about 60 degrees, I should say.

There are few drawbacks to mining here, as there is abundant coal within a few miles and sufficient water for boiler and battery requirements. The one drawback is the utter lack of timber, as nothing else than lagging poles are anywhere obtainable in the country, and even these are scarce. Therefore it is imperative that the stopes should be filled with waste, and that on the most improved principle and with the use of as little timber as possible.

At present the principal business is done on the exchange here, and nearly every share is above par; £1 shares run from 10s. to £60, the majority being from £10 to £25. Of course there are few that are really worth par, and fewer still that are worth even twice that. Of course there must come a crash, but it will not hurt true mining. When I say that at the present time it is not uncommon for £500,000 to change hands (in cash) in one day, over these shares, you can estimate the magnitude of the business done here.

I am empowered to try and secure the service of a first-class American miner to take charge of the opening up and scientific working of two or three of these properties. I am anxious to get a thoroughly good man, and not knowing personally any one good enough, I wish to ask if you would kindly take the trouble to secure the services of such a man and get him started as soon as possible.

As an example of the services which your ENGINEERING AND MINING JOURNAL performs for its advertisers as well as for us miners in distant lands, I may say that we have to-day wired to the Bullock Manufacturing Company, of Chicago, for two of their diamond prospecting core drills, which we see advertised in your pages.

THE AMERICAN INSTITUTE OF MINING ENGINEERS.

Proceedings of the New York Meeting.

Our editorial notice last week gave a general account of the proceedings of the meeting down to Wednesday evening. It should be added that the attendance, before the meeting was over, proved to be probably the largest in the history of the Institute. The impression which we gathered from an inspection of the registry on Wednesday morning (at at which time the larger portion of members attending the meeting had not registered) was therefore erroneous. In our last week's article, we inadvertently omitted to mention the paper by Mr. John Birkinbine and Mr. Thomas A. Edison, on the Magnetic Separation of Iron Ores, which was read at the Wednesday session in the Edison laboratory. Also, the note by Mr. N. W. Perry, on the new Electric Power Plant in the Comstock mines. With these amendments, our account down to Wednesday evening may be considered as sufficiently accurate and complete.

The session of Wednesday evening was largely attended by members of the Society of Civil Engineers, the regular meeting of that society on the same evening having been courteously suspended to permit a joint session with the Institute.

A communication from Mr. C. P. Sandberg of London and a reply from Mr. R. W. Hunt, in discussion of the paper of the latter on Steel Rails, presented at the Buffalo meeting, were first read; also a paper on the same subject by Mr. F. A. Delano, of Chicago; after which Mr. Hunt read a new paper on Rail-Sections. A lively, but largely irrelevant debate followed, in which Messrs. P. H. Dudley, Fritz, Pechin, Howe, Kent, Raymond, Potter, Chauvenet and Holloway took part. It was unfortunate that the subject of rail-sections, most ably and suggestively presented in the papers before the meeting, was crowded out of the debate by an apparently irresistible desire to talk about the best chemical constitution of pig-iron for making steel. To the latter topic, hundreds of pages of the Transactions have been devoted already, and nothing was said on this occasion which had not been said at previous meetings or in previous papers; whereas, the important question of the rail-section in its bearing upon the durability of rails had had comparatively little attention from the Institute. The Secretary pointed out this divergence of the discussion from its proper theme; but his preaching was better than his practice; for he proceeded to make some statements (too obviously and anciently true to be repeated here) about the practicable percentage of phosphorus in pig for the acid Bessemer process. The net result of all this part of the discussion was the reiteration of the fact, well known already in the trade, that 0·1 per cent of the phosphorus is what the Bessemer manufacturers regard as the maximum in the metal to be converted; that if they use pig-iron carrying more, they mix it with pig-iron carrying less; and hence, that they frequently impose strict specifications of, say, 0·09 or 0·08 phosphorus upon outside blast-furnaces from which they buy iron, that they may give their own blast-furnaces more lee-way, say, to 0·12 phosphorus. Nobody deserves credit for stating this fact; it was already public property.

The two speakers who said anything about rail-sections were Messrs. Dudley and Howe. Mr. Dudley's remarks were in the highest degree interesting and suggestive. As they will be printed in full, we will not do them the injustice of partial quotation, but will say only that Mr. Dudley was admitted by Mr. Hunt to have been a pioneer in the matter of a proper scheme for heavy sections, having designed for the N.Y.Central R. R. in 1883, according to indications furnished by the records of his "dynamometer-car," an 80-lb. section closely similar to that which Mr. Hunt now proposes.

Mr. Howe's brief remarks concerned the objection to thick heads on heavy sections arising from the resultant rolling at too high a temperature. He called attention to a remedy which had been tried and was apparently worthy of further trial, viz., the immersion of the head in oil or some other medium, cooling it to a dull red before rolling.

On Thursday morning, after the election of new members, Mr. C. Kirchhoff, Jr., read a number of communications on the use of petroleum as fuel in iron and steel works, and Messrs. Hunt, Pechin and Potter gave data of experiments within their knowledge, all of which will be published hereafter. The net result of the discussion did not seem to be very favorable to oil, on the score of economy, except in localities where it is relatively cheap and coal relatively dear.

Prof. W. P. Blake presented a paper on the copper deposits of Copper Basin, Arizona, and their origin, which he illustrated on the black-board in so skillful a way as to delight the audience.

Mr. H. J. Williams read a very interesting paper on the Determination of Silicon in Ferro-Silicons, and a Study of its Reactions with Alkaline Carbonates. Mr. Williams is about to become the chemist of the St. Louis Testing Works under Prof. Potter's direction.

On Thursday afternoon a large additional number of new members and associates was elected, making, with the morning's list, a total of 95. The Council presented the Annual Report, of which we give an abstract elsewhere. The scrutineers reported the following officers as elected: President, Richard Pearce, Argo, Colo.; Vice-Presidents (to serve two years), Eckley B. Coxe, Drifton, Pa., Charles Macdonald, New York City, Percival Roberts, Jr., Philadelphia, Pa.: Managers (to serve three years), J. H. Bramwell, Roanoke, Va., Frank Firmstone, Easton, Pa.; W. H. Peetee, Ann Arbor, Mich.; Treasurer, Theodore D. Rand, Philadelphia, Pa.; Secretary, Rossiter W. Raymond, New York City.

The following amendments to the rules, of which notice had been given at previous meetings, were discussed and adopted (subject to the approval of the members at large by ballot through the mails, as the rules require): In Rule II., the proviso was struck out, so that honorary members are hereafter eligible to office. In Rule V., at the end of the first sentence, were inserted the following words: "and if the Council, or a Committee thereof appointed for the purpose, shall have recommended any nominations, such recommendation may also be sent to members and associates with the said list of all nominations made, but not upon the same paper." And the phrase in the same rule, "stamped with the seal of the Institute," was struck out.

Mr. Pechin offered a resolution, that the annual meeting be devoted to the transaction of such business as may be presented, and to the reading and discussion of papers, excursions being generally omitted. (This is the form after amendment proposed by Professor Eggleston, and accepted by Mr. Pechin.) After considerable debate, the subject was laid on the table.

A great number of papers were read by title, among which one on the History, Functions and Limitations of the Institute, with an analysis of its rules, an explanation of the manner in which its business is conducted, and suggestions as to the writing, reading and discussion of papers, and the arrangements of local committees, by R. W. Raymond, New York City.

After the passage of a resolution instructing the Secretary to convey the thanks of the Institute for courtesies received, the session was adjourned.

The subscription dinner in the evening, at the Brunswick Hotel, was a brilliant affair. About 130 guests were present. President Potter presided, and Bishop Potter and Colonel Prentiss, among the speakers, represented the clergy and the law, while the Institute itself was represented by many of its well-known post-prandial orators, such as Bayles, Ridgely, Potter, Eckley Coxe, Raymond, and Carnegie, who made his first appearance, but earned at once the reputation of a veteran. To inquiring absentees, we might as well say at once that reports of the speeches are not to be had. The only way to enjoy one of these dinners is to attend it. This one, by the way, was good all round—cooking, music, —everything.

On Friday morning, a session was held at the Stevens Institute, Hoboken, when the following papers were read and discussed:

The Elliott Locked Rope, by E. G. Spilsbury, Trenton, N. J. (This is a new kind of wire rope, for which extraordinary results in strength and durability are claimed.)

The Genesis of a Nail, by Oberlin Smith, Bridgeton, N. J. (Mr. Smith described the ingenious process by which tin scrap is folded and stamped into a highly serviceable light nail, of special superiority for roofing purposes. This new departure in the utilization of tin scrap, over which so many futile experiments have been made in the chemical direction, aroused much interest.)

Notes upon Some Results of the Storage of Water in Arizona, by W.

P. Blake, New Haven, Conn. (A brief, but suggestive and encouraging account of the successful operation of a large dam on the Hassayampa River.)

The Re-opening of the Tilly Foster Iron Mine, by F. H. McDowell, New York City. (This admirable paper, describing the unprecedented operation of removing 200,000 cubic yards of solid granite, in order to make a body of iron-ore safely accessible, was illustrated with a series of stereopticon views. We understand that these views will be used also in a lecture by Mr. C. Kirchhoff, Jr., on American Mining, in the Cooper Union Course, next month, and that some of them will be engraved to accompany Mr. McDowell's paper.)

The Comparative Economy of Air-Compressors, by J. E. Denton, Hoboken N. J. (Prof. Denton's exceedingly clear and useful paper, illustrated by numerous lantern views, held the attention of the large audience for an hour. When published, with the engravings of the indicator-cards which enforce its argument, it will prove extremely useful to engineers as a careful investigation by competent and disinterested authority, of questions much obscured by commercial competition.)

After examining the many interesting, curious and instructive things to be seen in the laboratories, collections and shops of the Stevens Institute, the large party was entertained at luncheon in the house of President Morton.

The remainder of the day was spent in optional excursions to various points of interest, to which guides were furnished by the local committee.

The reception given on Friday evening, by Mr. and Mrs. A. S. Hewitt, was elegant and delightful. The interior of the house itself was a perpetual pleasure to the guests. There is probably no other private residence in New York so perfectly planned and furnished for such an entertainment; and Mr. Hewitt, having resigned (for a while, at least) the cares of state, wore, with not less dignity and apparently much more enjoyment, the cross-hammers of the Institute, as he cordially welcomed his fellow members.

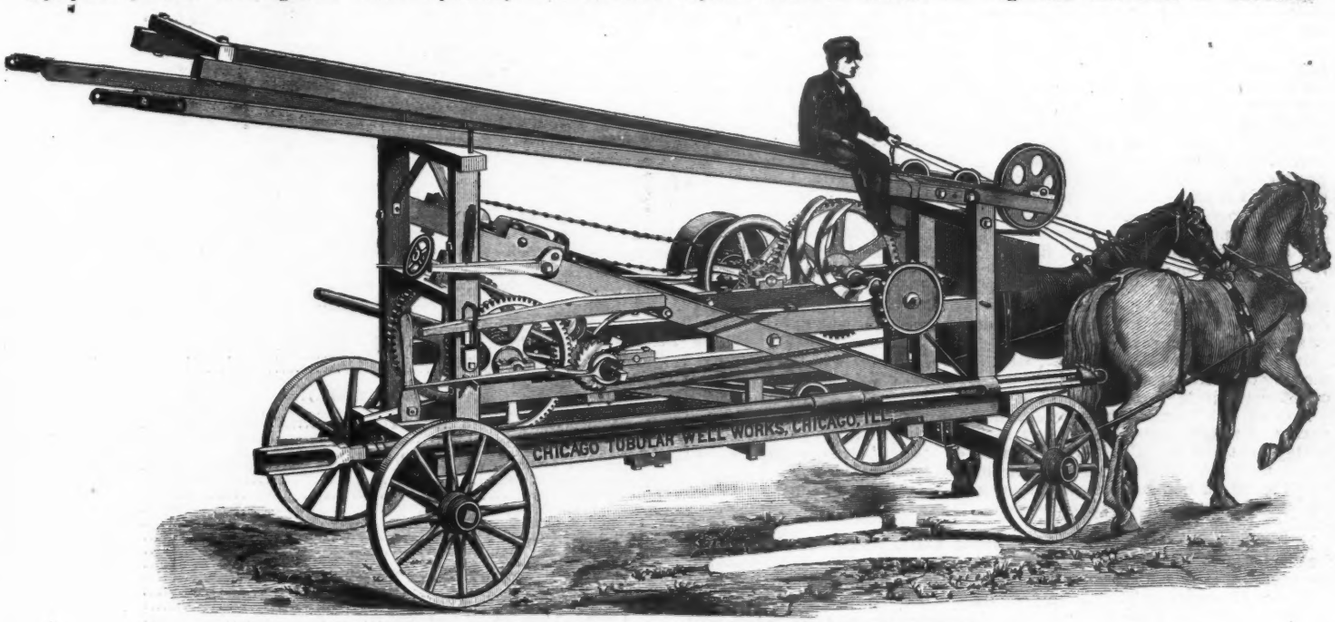
Saturday was occupied with an excursion by steamer to the Central Forging Company's works at Whitestone Landing, the United States Engineer School and Torpedo Station at Willets Point, and the Zalinski dynamite gun at Fort Hamilton. The day was cold and windy; but the steamer was comfortable, and the party was jolly. At the Central Company's works the process of heating and hammering heavy forgings was witnessed; at Willets Point, the laboratories and museum were inspected, and several torpedoes were exploded in honor of the company: and at Fort Hamilton, the dynamite gun was explained by Captain Zalinski, and then fired by one of the Institute ladies. Luncheon was served on the steamer, during the trip.

Great credit is due to the Local Committee for the completeness of all its arrangements. And it is only fair to specify the gentlemen to whom, as chairmen of the respective sub-committees, the success of the meeting in all departments is due. Mr. Wiley, as Local Secretary, selected an excellent hotel headquarters, and his assistant in charge, Mr. Thomas B. Lee, was at his post day and night, throughout the meeting, conducting a most efficient bureau of information, and provided with directories, maps, time-tables, messengers, free city and long-distance telephone service (the latter furnished by the courtesy of the Metropolitan and American companies) and all the means for assisting members. Mr. Wiley selected also an excellent hall for the sessions. If it had been nearer the hotel, it would have been still more convenient; but we know of no suitable hall nearer the hotel and no suitable hotel nearer the hall. And after all, the distance was but a short walk—far shorter than the usual average of Institute experience. Mr. L. Holbrook, chairman of the Dinner Committee, provided an admirable *menu*, excellent wines, tasteful decorations, and good music, and selected the most elegant room in the city for a banquet of the number of guests accommodated. We have seldom seen a more brilliant and yet harmonious *tout ensemble* than was presented by this dinner-party. Mr. J. C. Bayles, who was in charge of the printing of programmes and *menu*, and the preparation of badges, received due recognition for the humorous illustrations of the *menu*, and for the felicitous design of the badge of the meeting—iron cross-hammers, suspended by a ribbon from a clasp, after the fashion of an "order." Mr. J. F. Lewis, as chairman of the Committee on Excursions, planned and executed the transportation and guidance of the numerous company with the well-known executive ability which made him famous, years and years ago, at the Amenia meeting: and finally, as we understand, Mr. Carnegie, as chairman of the Local Committee, and the Secretary of the Institute, as its Treasurer, constituted the important sub-committee on Finance. Taken together, they certainly made a strong team! Lest it should be inferred, however, that the work of this committee consisted merely in the presentation of the bills by one member and their payment by the other, we state, at the Treasurer's request, that his special circular to New York members received a liberal response from many contributors.

PORTABLE ROCK DRILLING MACHINERY.

This is the age of deep drilling and in every part of the world the crust of the earth is being probed by drill holes in search of water, of oil, of gas, of coal, or of minerals of other kinds. In the great prairie States of the west the art of the well sinker has attained great prominence and perfection, and has been extremely profitable. The necessity for procuring water from wells for irrigation, has caused the boring of deep holes to be a common occurrence and yet this department of engineering is still in its early infancy. A few years hence will see the number of wells increased enormously and with the increase in experience come improvements in machinery and a diminution in cost of work.

The boring for petroleum and for natural gas has given an amount of experience that has enabled our ingenious mechanics to introduce improvements in drilling and well sinking appliances that place the American practice far in advance of that of any other country. This fact is recognized in a substantial manner by the numerous orders that come from foreign countries for American machines. A very considerable number of Diamond Drills have gone to Australia where several of the Provincial governments keep drilling parties constantly at work boring for water.



THE AUSTIN PORTABLE ROCK DRILLING MACHINE.

On another page one of our correspondents writing from South Africa tells us of two diamond drills having been ordered from a Chicago firm who advertise in the ENGINEERING AND MINING JOURNAL, the drills to go to the Transvaal. Negotiations are now in progress here for drills to go to Austria, and many have already gone to Russia.

These orders are for complete and expensive deep boring plants, but the most extensive class of bore holes require a much simpler and less expensive outfit, and for these one of the very best machines is that called the Austin Portable Rock Drilling Machine, which we illustrate herewith. The entire apparatus is extremely simple, and yet strong, and it can be put up and taken down in a few minutes.

The portable drill is suitable for boring to a depth of 300 to 400 feet. It is furnished complete in every respect at from $600 to $900, and can be run either by steam or horse power.

It is a percussion drill, makes about 61 strokes a minute, and bores with astonishing rapidity through almost any kind of rock. Some of the advantages claimed for this drill are as follows: It is provided with a screw or worm feed so that the drilling is done "on the spring of the rope," the rope being always kept tight. The derrick is hinged and is laid over the machine when on the road, as shown in the accompanying illustration, and it is easily raised by one man operating a crank.

The double divided and circular cam used possesses many advantages increasing the capacity and durability of the machine. It would far exceed the limits of space at our command to enter into a full description of this machine, and indeed, this is not necessary, for if any of our readers who have wells to bore will write to Messrs. Goulds & Austin of Chicago, Ill., they will receive a handsomely illustrated and well indexed catalogue, giving all kinds of useful information concerning drilling implements from drive well tubes to diamond drills, the cost of the several parts of the same and the records which many of them have made in practice. If the tools as well as the information be needed, our readers will find Messrs. Goulds & Austin a thoroughly responsible house capable of carrying through to success and with satisfaction whatever they undertake to do.

QUICKSILVER IN 1888.

Written for the Engineering and Mining Journal by J. B. Randol.

The production of quicksilver in California was 33,250 flasks of 76½ pounds each, a decrease of 510 flasks compared with 1887; but still a greater production than was expected by those best informed as to the real condition of the mines. The following table shows the production of the several mines for five years past:

Mines.	1884.	1885.	1886.	1887.	1888.
New Almaden	20,000	21,400	18,000	20,000	18,000
Ætna	2,931	1,309	3,478	2,694	959
Napa Con	1,376	2,197	1,769	2,880	4,065
Great Western	3,292	3,469	1,949	1,446	625
Sulphur Bank	890	1,296	1,449	1,890	2,164
New Idria	1,025	1,144	1,406	1,490	1,320
Great Eastern	332	446	735	689	1,151
Redington	881	385	409	673	126
Guadalupe	1,179	35	.....	.....	.....
Bradford	.....	.....	.....	1,543	3,848
Various	7	392	786	455	992
Total flasks	31,913	32,073	29,981	33,760	33,250
Lowest price per flask	$26.00	$28.50	$32.00	$36.50	$37.00
Highest " "	35.00	32.00	39.00	48.00	48.00
Average " "	30.50	30.25	35.50	42.25	42.50
Total value at average price.	$975,000	$970,000	$1,060,000	$1,425,000	$1,415,000

The New Almaden mine fell off 2,000 flasks, but retains the lead as the largest producer; the Napa Consolidated increased its product to 4,065 flasks, a gain of 1,185, and again stands second, as it did in 1887. The Bradford began to produce in 1887 and supplied 1,543 flasks; last year it increased to 3,848, a gain of 2,305—and now ranks third with a good prospect of becoming second. This mine is situated in Lake County, and so far, good ore mined near the surface has made good profits for its fortunate owners, while old mines, working poor ores at greater depths, have only continued their existence by levying assessments, and calling on stockholders for the return of profits distributed in former times of prosperity. Of these the Great Western is the most notable example. Its production in 1880 was 6,442 flasks, in 1887, 1,446 and last year it fell off to 625 flasks. The Sulphur Bank turned out 11,152 flasks in 1881; it made only 890 flasks in 1884 and then assessments were in order. Its yearly production since has been 1,296, 1,449, 1,890 and 2,164 flasks; the last year's gain being 274 flasks. The Ætna also had a serious loss in its production; in 1886 its yield was 3,478 flasks, in 1887 it was 2,694, and in 1888 only 959 flasks. The Redington is reduced to 126 flasks, almost nothing, and probably will soon pass off the record of producers, like the Guadalupe and many others, which already have been, or soon will be, dropped from the list. The New Idria made a slight gain in 1887 producing 1,490 flasks, but was a loser last year of 170, making only 1,320 flasks. The Great Eastern increased its small output of 689 flasks in 1887 to 1,151 in 1888, a gain of 462 flasks.

No new quicksilver mines were opened nor were any discoveries reported of new cinnabar deposits of sufficient importance to repay the outlay for their working. The rumors of "finds" were abundant, as usual, but none could bear investigation, and it is to be greatly feared that California will not have any new mines to be worked, while it is too certain that the quicksilver mines of to-day are unable to arrest the steady decline in their production.

In the five years 1879–1883 the California mines yielded 293,918 flasks; for the last five years 1884–1888, with the inducement of higher prices for the product, only 160,977 flasks were produced, a decrease of 132,941 flasks, or 45 per cent. For the first period the total value was $8,545,000, an average of $29.07 per flask; for the last, the value was $5,845,000, an average of $36.61; a decrease of $2,700,000 in total value, and only 25 per cent. increase in average value per flask.

Yet, with these hard lines for the quicksilver producers, as shown by indisputable facts, the House of Representatives passed the Mills tariff bill which removed the 10 per cent *ad valorem* duty on quicksilver and placed it on the *free list;* fortunately our grave senators did not consider it wise to close all the California quicksilver mines (which would have soon followed had the free list tariff become the law), and, therefore, the Senate tariff bill imposed a specific duty of six cents per pound.

The quicksilver producers desired to have a duty of ten cents per pound, knowing that rate to be only a fair protection against the competition of foreign mines which have richer and more abundant ores, with large reserves and low-priced labor. This matter was ably presented in the tariff debate by the Hon. C. N. Felton, Member of Congress from the district embracing New Almaden, and the quicksilver miners are deeply grateful for his efforts in their behalf.

The question of duty has yet to be determined, and it is to be hoped, by the Senate bill becoming the law, but amended to make the rate ten cents per pound. In the United States, outside of California, the only product worth noting was in Oregon, near the California line; 65 flasks were reported for 1887, and for 1888, 32 flasks. It is not supposed there will be any notable increase from that source.

The shipments from San Francisco to foreign countries show a decline of 152 flasks, as follows:

	1887.	1888.		
China	3,105	3,761	Increase,	656
Mexico	6,397	4,766	Decrease,	1,631
Central America	119	712	Increase,	593
New Zealand	150	286	Increase,	136
Various	28	72	Increase,	44
Total flasks	9,749	9,597	Decrease,	152

The shipments by steamers to New York were 2320 flasks against 8370 for the previous year, a decrease of 6050; and the movements by railroad, outside of the local use in California, Nevada and Arizona, were 7833 flasks, or 3833 more than in 1887. The total shipments to points beyond California, Nevada and Arizona were 19,550 flasks against an outlet of 22,110 in 1887; the balance, 11,641 flasks in 1887, and 13,500 last year, is accounted for by current stock and estimated consumption in California, Nevada and Arizona. The outlook for 1889 is for a further decrease in production and higher prices, based on a larger consumption caused by renewed activity in gold and silver mining, as well as by increased demands from other quarters.

The following table gives the fluctuations in price of quicksilver in London and New York during 1888:

		London—Rothschild. £. s. d.	London—Outsiders. £. s. d.	New York equivalent of London outsiders' price, duty paid.	Price of Californian quicksilver in New York.
January	Highest	10 0 0	10 0 0	$53.28	$47.00
	Lowest	8 10 0	8 15 0	46.62	42.00
February	Highest	9 0 0	8 15 0	46.62	43.00
	Lowest	8 10 0	8 5 0	43.95	40.00
March	Highest	8 10 0	8 5 0	43.95	41.00
	Lowest	8 0 0	7 12 6	40.62	40.00
April	Highest	8 0 0	7 15 0	41.29	40.00
	Lowest	7 0 0	6 17 6	36.62	37.00
May	Highest	7 5 0	7 1 0	37.55	37.00
	Lowest	7 2 6	6 12 6	35.29	36.00
June	Highest	8 0 0	7 16 0	41.55	40.00
	Lowest	7 2 6	7 1 0	37.55	36.00
July	Highest	8 0 0	7 15 0	41.29	40.00
	Lowest	7 7 6	7 2 6	37.95	38.00
August	Highest	8 0 0	7 17 6	41.95	41.00
	Lowest	7 7 6	7 7 6	39.12	39.00
September	Highest	9 0 0	8 15 0	46.62	43.50
	Lowest	8 0 0	8 0 0	42.62	41.00
October	Highest	9 10 0	9 2 6	48.62	45.00
	Lowest	9 0 0	8 8 0	44.74	43.00
November	Highest	9 10 0	8 17 6	47.28	45.00
	Lowest	9 10 0	8 1 6	43.02	43.00
December	Highest	9 10 0	8 7 6	44.62	42.00
	Lowest	9 10 0	7 15 0	41.29	45.00
For the year	Lowest	7 0 0	6 12 6	36.62	36.00
	Highest	10 0 0	10 0 0	53.28	47.00

It will be noted that Messrs. Rothschild opened the year with their price at £10, on a par with that of outside holders, dealers and speculators in general, and the record shows the latter during January quoted £8 15s. against Rothschild's £8 10s., something quite novel. After many fluctuations in November, Rothschilds fixed their prices at £9 10s., and thus held it until January, 1889. The outsiders took the market in hand, selling from £8 17s. 6d. in November down to £7 15s. at end of year. Why this unusually wide difference in price was maintained for so long a time or why it existed at all is beyond the ken of common mortals. A further examination of the table will show that almost uniformly Californian quicksilver was quoted at a less price than the lowest quoted foreign article duty paid, in some cases the difference being $45 against $48.62. Messrs. Rothschild maintained their price at £9 10s. until February 5th, 1889, when they dropped it to £8, outsiders falling to £7 12s. 6d. On February 6th Rothschilds depressed their price to £7 10s., and the same date raised to £8, the outsiders following to £7 15s., all of which made a lively market for the speculators, but it is doubtful if such unnatural fluctuations are of benefit to consumer or producer.

The following table has been prepared from the Board of Trade returns for the United Kingdom.

IMPORTS OF QUICKSILVER INTO AND EXPORTS FROM ENGLAND DURING THE YEAR 1888.

Total imports	73,768 flasks.
Total exports, as follows	47,133 flasks.
To	Flasks.
Russia, Norway, Sweden and Denmark	123
Germany	4,101
Holland and Belgium	1,358
Channel Islands	40
France	4,884
Austria, Italy and Roumania	8
Spain and Portugal	475
Turkey	33
Egypt, Morocco and Gold Coast	88
Cape of Good Hope and Natal	717
Madras, Bombay and Bengal	3,076
China	10,267
Japan	334
N. S. Wales, Victoria, Queensland and South Australia	1,598
New Zealand	146
Canada	13
United States, North America	4,649
Mexico	9,967
West Indies	218
Central America	253
Colombia, British Guiana and Venezuela	190
Brazil, Argentine Republic, Uraguay and Bolivia	764
Peru and Chili	3,831

Compared with 1887, we have the following:	1887.	1888.
Imports	61,114	73,768
Exports	62,606	47,133

Messrs. J. Bennett Brothers, London, estimate stock in London, roughly calculated, as about 49,000 flasks, December 31st, 1888, against 38,000 at end of 1887. The London supply embraces all the product of the great mine of Almaden, Spain, and the surplus production of the Idria mine, Austria and the Italian mines. Of the total imports, 73,768 flasks, it is estimated about 53,000 were from Spain, and it will be noted that 475 flasks were re-exported to Spain and Portugal. Spain and Italy levy an import duty on quicksilver, respectively of 160 pesetas on 100 kilo, and 10 francs on 220·46 pounds.

Unfortunately, the figures of the production of foreign quicksilver mines for 1888 are not yet in hand, but the following are the latest obtainable at the present writing:

	Almaden, Spain.	Idria, Austria.	Italian mines.
1883	46,143	13,152	6,065
1884	43,099	13,967	7,850
1885	46,739	13,503	6,966
1886	51,199	14,496	7,375
1887	53,276	14,676	7,500*
Total, flasks	240,456	69,794	35,755
Average production yearly, flasks.	48,090	13,960	7,150

* Estimated.

The grand total of the foreign mines for the five years ending with 1887 was 346,005 flasks, and for the same time the mines of the United States produced 174,452 flasks, a difference of 171,553 flasks, or nearly 100 per cent. in favor of the foreign mines.

It should be observed that the mine of Almaden, Spain, is owned and worked by the Government. Its reserves are estimated to be sufficient to keep up a production equal to the late average output, for a period of one hundred years, even if no new ore bodies were discovered. The Idria mine, Austria, is also owned by the Government and worked under its control. It is not so rich as Almaden, and its reserves are estimated to last only 70 years at the present rate of production.

The mines of California may be said to be without any reserves, except for a few months in advance at the best, and it is only by unceasing search for new ore bodies, oftentimes without returns, that their existence is continued from year to year.

THE WORTHINGTON INDEPENDENT CONDENSER.

The condenser as an economic attachment of the steam engine is very far from being fully appreciated, though it is being introduced very generally at all well-regulated works. If the full advantages to be gained from an efficient condenser were better understood, and the simplicity and inexpensiveness of some of those now in use were better known, there would probably be few engines in the country unprovided with this money-saver.

The object of the condenser is, of course, to create a vacuum on one side of the engine piston while the steam presses on the other, and as by a good condensation of the exhaust steam a vacuum of, let us say, 26 inches of mercury gauge, is effected, which would be equivalent to a pressure of about 12 pounds per square inch on the piston, we can readily calculate the gain or economy which the adoption of a good condenser may effect in the working of a non-condensing engine.

Thus by Watt's formula, if A = area of piston in square inches, V = velocity of piston in feet per minute, $M.\ E.\ P.$ = mean effective pressure of steam in pounds per square inch of piston, then

$$\frac{A \times V \times M E P}{33{,}000} = \text{horse-power.}$$

If $M.\ E.\ P.$ is equal to 12 pounds, the value of this vacuum is found by this simple substitution.

We illustrate herewith the Worthington independent condenser, one of the most simple and efficient of these machines yet made.

The illustration shows a longitudinal section of one side of the condenser pump, and also a section of the condenser cone, spray pipe, exhaust elbow and injection elbow. It shows plainly the general construction of the parts. *A* is the vapor opening, to which is connected the pipe that conducts to the apparatus the steam or vapor that is to be condensed, and in which a vacuum is to be made and maintained. The injection water used to produce the condensation of the steam or vapor is conveyed by a proper pipe attached to the injection opening at *B*. This injection opening must not be more than twenty feet above the surface of the water supply when the apparatus is used with engines, and fifteen feet when in connection with vacuum pans.

The condenser elevates the discharge water to any desired height. Owing to the unseparated state in which the discharge water and air are delivered, it accomplishes this perfectly without noise or concussion.

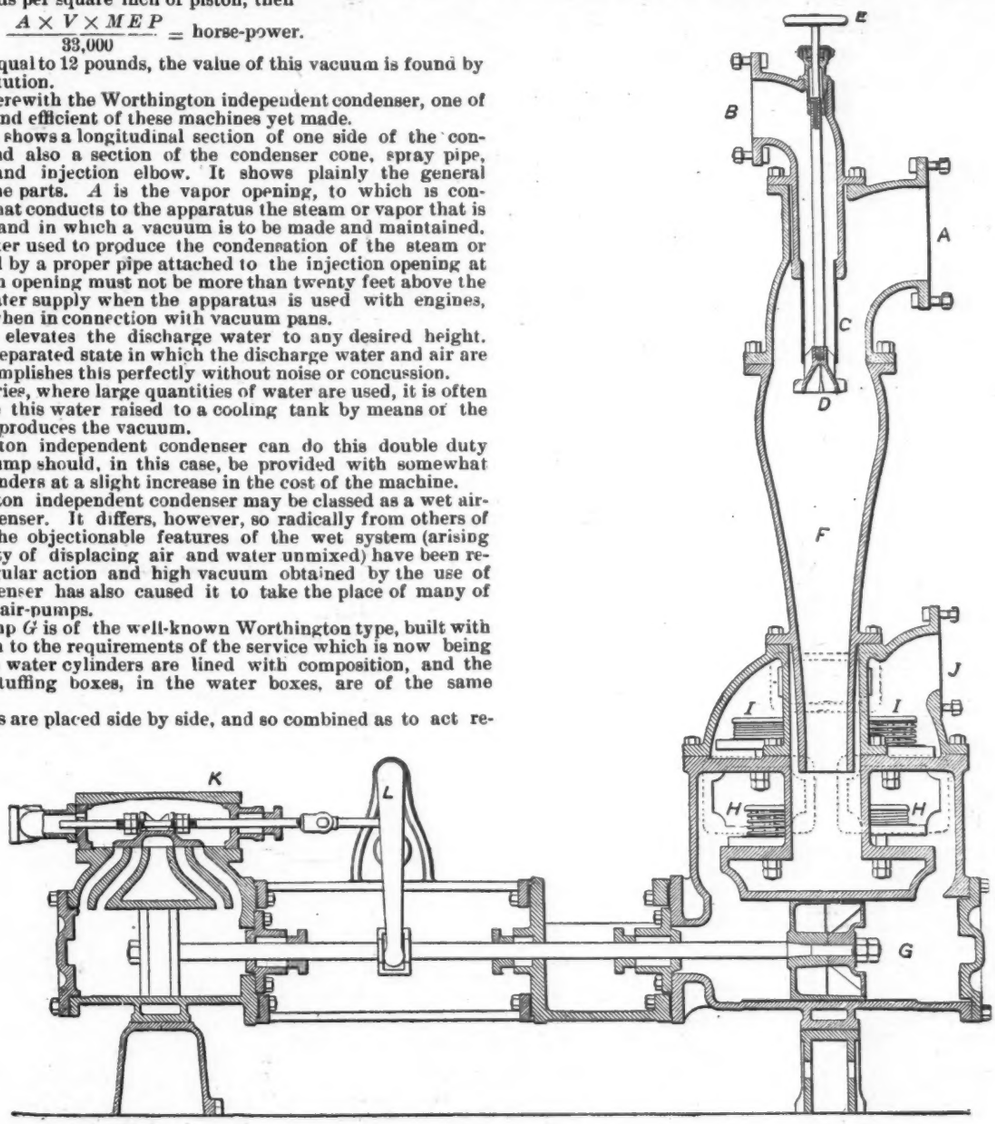
In sugar refineries, where large quantities of water are used, it is often desirable to have this water raised to a cooling tank by means of the same pump that produces the vacuum.

The Worthington independent condenser can do this double duty with ease; the pump should, in this case, be provided with somewhat larger steam cylinders at a slight increase in the cost of the machine.

The Worthington independent condenser may be classed as a wet air-pump and condenser. It differs, however, so radically from others of this class, that the objectionable features of the wet system (arising from the difficulty of displacing air and water unmixed) have been removed. The regular action and high vacuum obtained by the use of this duplex condenser has also caused it to take the place of many of the so-called dry air-pumps.

The piston pump *G* is of the well-known Worthington type, built with especial attention to the requirements of the service which is now being considered. The water cylinders are lined with composition, and the glands of the stuffing boxes, in the water boxes, are of the same material.

The two pumps are placed side by side, and so combined as to act reciprocally upon the steam valves of each other. One piston acts to give steam to the other, after which it finishes its own stroke and waits for its valve to be acted upon before it can renew its motion. This pause allows all the water valves to seat quietly.



SECTIONAL VIEW OF THE WORTHINGTON INDEPENDENT CONDENSER.

The operation of the condensing apparatus is as follows: Steam being admitted to the cylinders *K*, so as to set the pump in motion, a vacuum is formed in the condenser, the engine cylinder, the connecting exhaust pipe, and the injection pipe. This causes the injection water to enter through the injection pipe attached at *B* and spray pipe *C* into the condenser cone *F*. The main engine being then started, the exhaust steam enters through the exhaust pipe at *A*, and coming in contact with the cold water, is rapidly condensed. The velocity of the steam is communicated to the water, and the whole passes through the cone *F* into the pump *G* at a high velocity, carrying with it, in a thoroughly commingled condition, all the air or uncondensable vapor which enters the condenser with the steam. The mingled air and water is discharged by the pump through the valves and pipe at *J* before sufficient time or space has been allowed for separation to occur.

Full instructions for managing this simple and effective machine and its varied applications to pumping engines, steam engines at mines, in steamships, at sugar works, and, in fact, wherever steam engines are used, are given in a fully illustrated catalogue issued by Henry R. Worthington, New York, the manufacturer, who will be pleased to send the pamphlet to those desiring it.

PRODUCTION OF GOLD AND SILVER IN THE UNITED STATES IN 1888.

The Director of the Mint has submitted to Congress his report on the production of gold and silver in the United States during the calendar year 1888.

The gold product was 1,604.927 fine ounces of the value of $33,175,000. This is about the same as in 1887, being an excess of only $175,000.

The silver product was 45,783,632 fine ounces of the commercial value of about $43,000,000, and of the coining value of $59,195,000. This is an increase of 4,515,327 fine ounces over the product in 1887.

In addition to the product of our own mines some 10,000,000 ounces of silver were extracted in the United States from foreign ores and base bullion, principally Mexican.

The total refined product of the United States was in gold 1,777,877 fine ounces, and of silver 53,128,698 fine ounces.

The average price of silver during the year was about 94 cents. At this price the bullion value of the silver contained in the silver dollar was $0.72·6; at the highest price of silver during the year the bullion value of the silver dollar was $0.75·5; and at the lowest price $0.70·5.

The government purchased 28,920,398 standard ounces of silver during the year, costing $24,491,340, an average price of 94 cents per fine ounce. The total amount of silver purchased for the coinage of the silver dollar since March 1st, 1878, has been 275,007,939 standard ounces, costing $266,091,445, an average price of $1.07·5 per fine ounce or $0.96·7 per standard ounce.

The value of the gold deposited at the mints during the year, not including re-deposits, was $41 496,410, or including re-deposits, $48,794,988. The foreign material comprised in this was $7,055,046.

The amount of silver deposited and purchased was 35,512,789 standard ounces of the coining value of $41,323,973, exclusive of re-deposits.

The coinage of the mints during the calendar year 1888, was as follows:

Gold	$31,380,808
Silver dollars	31,990,833
Subsidiary silver	1,034 773
Minor	912,201
Total	$65,318,615

In addition to the coinage, bars were manufactured at the mints containing gold of the value of $21,650,798 and of silver, $7,635.490.

The import of gold bullion and coin was $11,031,941, and the exports $34,619,667; a loss by export of $23,587,726.

The import of silver was $21,592,062, and the export $29,895,222, a loss by export of $8.303.160.

The metallic stock of the United States, January 1, 1889, including bullion in the mints awaiting coinage, is estimated by the Director to have been: gold, $705.061,975; silver, $403.516,756; total $1,108.578,731.

The stock of coined and paper money in circulation January 1st, 1888, was $1,396,106.154, against $1,376,930,003 on January 1st, 1888, an increase of $19,175,151.

The Director estimates the consumption of gold and silver in the industries in the United States during the calendar year 1888 to have been: Gold, $14,600,000; silver, $5,280,000.

STEEL CROSS-TIES FOR THE NEW YORK ELEVATED ROADS.

The growing interest taken in the subject of railway metal cross-ties is very manifest by the active and substantial manner in which some of our leading railway managers are giving the subject consideration. Several of our large trunk lines are now experimenting with a view to adopting steel ties in place of wood, believing them to be more advantageous.

In the ENGINEERING AND MINING JOURNAL, of December 29th last, the Evolution of the Metal Cross-Tie was illustrated, and this article has attracted much serious attention among railroad men. Preparations are now being made to place a section of "Standard" steel ties on the Manhattan Elevated Railway, preparatory to its adoption. Thus it would appear that while the managers of our surface roads are "giving the matter consideration," Colonel Hain has given it careful study and has already satisfied himself as to the merits and advantages of the steel tie over wood. Evidently Col. Hain knows what he wants, and trusts his own good judgment in deciding what to use rather than wait for someone else to furnish him with experience.

The following illustrations represent the form of tie to be used on the Elevated road and show how admirably this tie has been adapted to that structure:

Fig. 1 represents a side elevation of the tie and guard rail braces, showing end views of the rails, guard rails and central platform, also a fractional view of the upper portion of the structure.

Fig. 2 represents an end view of the tie and guard rail braces, showing portions of the guard rail and upper chord in side elevation.

Fig. 3 illustrates a transverse vertical section through the rail and clips, showing the powerful means employed to hold the rail firm upon the end fiber of the creosoted oak block.

Fig. 4 illustrates the method of making the rail joint, whereby the ends of the rails are held *positively* rigid upon the "joint plate," thus avoiding all possibility of uneven or loose rail joints.

Fig. 5 represents a plan or top view, the details of which are so clear as to need no special description. Every part appears to have received careful study, the result of which is a very perfect structure, showing marked improvement on the present system.

With the elevated road and all bridge structures, the upper chord is the top of the main structure (see *a*, Figs. 1, 2, 3, 4), and upon this chord the wood ties are laid crosswise, and upon the ties the rails and guard rails are laid, crosswise of the ties and longitudinal of the upper chord. The rails are spiked to the ties and the guard rails are bolted to the ties also; the latter are fastened to the upper chord by what are termed "hook-bolts," *i. e.*, the bolt is hooked under the flange of the upper chord and passes up through the tie, and a nut is screwed on the end of the bolt to hold the tie in position. The hook bolt is probably the best device for holding the wood tie that can be devised, yet the ties so held are far from being firm or rigidly connected with the upper chord, simply because the swelling and shrinking of the tie and the strain upon the hook draws the nut and its washer down into the upper surface of the tie and the bolt is quite loose, leaving the tie comparatively free to vibrate.

It is a recognized fact among engineers that rails are quite loose where spike fastenings are employed, the cause of which is generally understood to be the imperfect hold which the spikes have in the wood tie, from the fact that if you do not "drive the spike home" so that its head is seated upon the rail base and the latter upon the tie, the rail is loose from the start, and if you drive the spike with sufficient force to draw the rail down to a proper seat, the fiber of the wood is generally destroyed and the rail will soon become very loose.

Moreover, the present rails, ties and guard rails, are a dead weight, which the structure must carry in addition to the train load, without rendering any assistance to the structure whatever, acting on the contrary as intermediate vibrating parts, which pound the upper chords, making great noise and doing injury to the main structure.

These injurious features have been overcome by the adoption of the "Standard" steel ties, which are riveted to the upper chord (see Figs. 2, 3, and 5), and are thus made a part of the main structure, reducing the lateral vibration of the upper chords to almost nothing, and equalizing the strain upon the longitudinal girders. The form of the "Standard" tie is simply a channel beam with the channel side up, the edges being cut away under each rail (see Fig. 1) in order that the rails will have no bearing on the sides of the tie, and to assist in keeping the rails from sliding sideways. Directly under the rail in the channel of the tie, and directly over each longitudinal girder, a creosoted oak block is placed with its grain vertical (see Fig. 3) and upon this block the rail rests, the block being sufficiently high to raise the rails clear of the depressions cut in the sides of the tie so that no metal contact is had between the rails and tie.

The rail fastenings consist of a pair of steel spring clips (see *c*, Fig. 3), each of which is provided with two lugs, extending through the sides of the tie (see *g*, Figs. 1 and 3); the upper end of each clip is provided with a jaw, which slides over the upper surface of the rail base; a bolt is passed through each pair of clips and block under the rail sufficiently low *in* the block to avoid contact with the under side of the rail base; a nut is employed to draw the jaws (*e*) toward each other over the rail base, creating a seating and holding power which is very great. Actual tests show that the oak block on its end grain resists a pressure of 101 tons per square inch, without fracture or compression. If the character of the fastenings are taken into consideration, together with the resistance of the oak block and its foundation, and that the tie is riveted to the structure, it is obvious that the rail itself becomes a part of the main structure and cannot vibrate independently. Thus the rail is utilized to assist the structure to carry its load instead of being a dead weight.

The method of fastening the guard rails seems also to have been improved; each guard rail is provided with two bolts to each tie instead of one as formerly, and are also braced with steel plates on the outside for the same purpose.

The annoying features of loose rail joints rattling and making a noise every time a wheel passes is overcome by the adoption of the steel tie, as will be readily understood by referring to the drawing. Fig. 4 represents a perspective view of the broad joint tie, illustrated as the middle tie in Fig. 5. The clips in this tie are provided with two bolts instead of one, the tie is extra broad and the clips extra long so that a large foundation for the ends of each rail to rest upon may be had, together with a powerful fastening to hold the ends solid and rigid upon their foundation. In order to guard against the possibility of the ends of the rail cutting down into the wood block and also from creeping, a steel plate (see *s*, Figs. 4 and 5) is provided which covers the upper surface of the block, the latter being shortened to provide for the thickness of the plate, which is provided with four lugs that engage with recesses in the side of the rail base to prevent the rail from creeping, provision having been made for contraction, etc.

The application of the "standard" steel tie to the Elevated road, it is expected, will reduce the noise in a very noticeable degree, and that the track will be much more reliable and smoother to ride over; and it is claimed, also, that a very great saving will be shown in favor of the steel tie, confirming the excellent judgment of Col. Hain in adopting them.

OLEOMARGARINE MANUFACTURE.

As we are all consumers, more or less, of oleomargarine, and as it is largely exported, we take from the report of the Commissioner of Internal Revenue the following description of the methods employed in this country in its manufacture:

The following ingredients enter into the manufacture of oleomargarine as pursued in this country: Oleo oil, neutral lard, some liquid vegetable oil, as cottonseed, sesame or peanut; butter, in the higher grades, cream and milk, together with salt, and annatto or other coloring matter. Very few of the oleomargarine manufacturers make their own oleo oil or neutral lard, and none of them refine or crush the vegetable oils used in the lower grades of oleomargarine, but buy them in the open market, these materials being now well established commercial products.

The manufacture of oleo oil is generally carried on in connection with the large slaughter and packing-houses situated in or near the principal cities, where every effort is made to utilize all portions of the cattle slaughtered. The caul and suet fats are removed from the freshly slaughtered beeves and placed in tanks filled with water at 75° to 85° F., where they remain from two to three hours before being transferred to other tanks containing ice water. By this procedure the fats are gradually deprived of their animal heat, and the danger of their becoming sour is avoided, as would happen if the mass of fat was suddenly chilled by being placed directly in ice water. The caul, long or slaughter fat, is kept separate from the suet fat, which yields an inferior grade of oil.

A Texan steer will yield on an average 65 pounds of caul and suet fats, from which are obtained 28 pounds (43 per cent) oleo oil, 21 pounds (32 per cent) oleo stearine, and 12 pounds (20 per cent) high grade tallow. The chilled fats, having been thoroughly washed to remove any blood that may be present, are then sent to the rendering tanks. These are generally in a separate building from the slaughter house. Fat from cattle slaughtered late in the afternoon is generally kept in the ice-water tanks over night before being rendered; thus no fat is more than twelve or fourteen hours on hand, and the great majority less than four hours, before it is rendered. The fat is fed into choppers or hashers revolving at a high rate of speed, from which it issues through fine sieves directly into the rendering tank. This is a large steam-jacketed upright kettle of 2000 to 5000 pounds capacity, provided with revolving blades driven by suitable machinery. Steam being turned on in the jacket, the hashed fat is fed continuously into the tank and kept in motion by the stirrer. When the tank is full and the contents thoroughly melted, the temperature being 120 degrees to 150 degrees F., the stirrer is removed and the water and scrap allowed to settle. The clear fat is drawn off from the top and run into the graining or seeding cars of 400 to 600 pounds capacity, where it is allowed to chill. The temperature of the room in which these cars are stored is maintained at 85 degrees to 95 degrees F. The fat in chilling naturally solidifies gradually; the hardest variety, the stearine, being the first to form a thin crust on top and sides. In from one to three days the whole contents of the car will be in a semi-solid condition. This fat is free from all "greasy" taste. The car containing the semi-solid fat is taken to the press-room, which is maintained at a temperature somewhat below that of the seeding room, viz., 70 degrees to 80 degrees F., where it is dipped out by ladle and poured on a stout linen cloth, placed in a suitable depression on a wooden revolving table, and after the cloth is properly folded so as to make a rough bag, it is transferred to the metal plate of a screw-press. A dozen of these cloth bags cover the surface of a plate. When one plate is covered another one is let down and filled. When the press is filled, pressure is gradually applied by means of an

Fig. 1

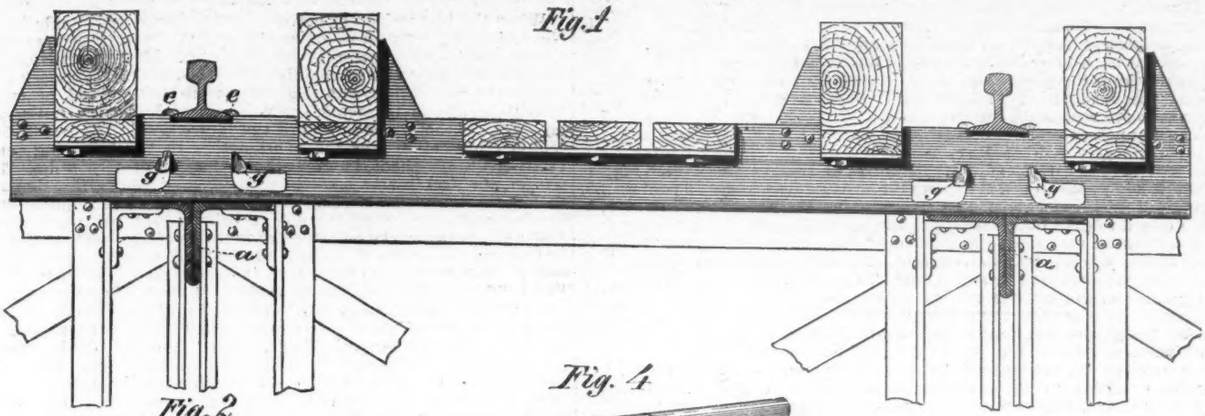


Fig. 2

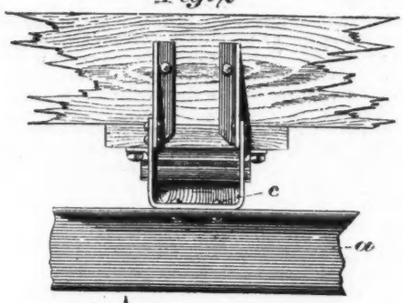


Fig. 4

Fig. 3

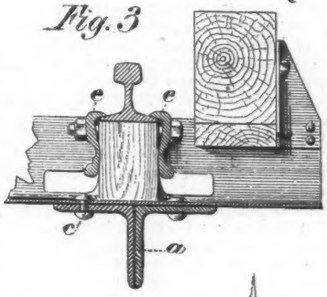
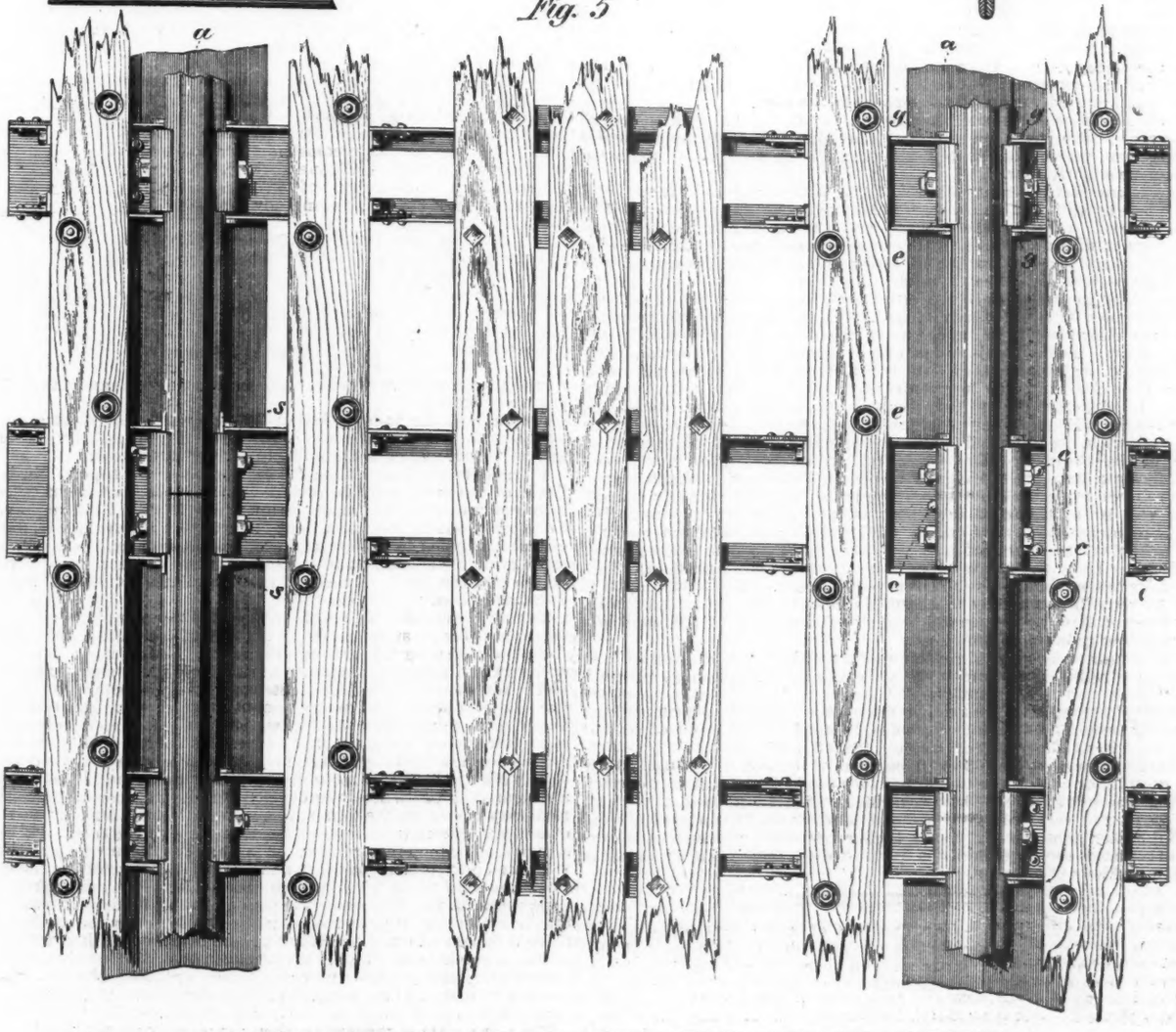


Fig. 5



STANDARD STEEL TIES FOR THE MANHATTAN ELEVATED RAILWAY.

endless chain revolving a screw; the expressed "oil" constitutes the "oleo oil." This liquid fat is conducted, still hot, from the press into barrels or cars where it is allowed to cool. The finished product is nearly colorless, tasteless, and at ordinary temperatures is a soft, granular fat, rather than an oil. The hard fat remaining in the filter bags is removed from the press and forms the beef or oleo stearine, which is used either for making "refined lard," by the addition of cottonseed oil, or sold to the soap and candle makers.

The manufacture of "neutral lard" is conducted by essentially the same machinery and at about the same temperature employed in the manufacture of "oleo oil." Only the leaf fat of freshly slaughtered hogs is used. A hog yields from 5 to 15 pounds of leaf lard, averaging 9 pounds, 100 pounds of which yield 90 pounds "neutral." The "neutral," however, is not pressed to extract the stearine, but is run directly from the rendering tank into a very strong iced brine, where it remains for about twenty-four hours, when it is removed and placed on shelves to drain. The "neutral" is a white, slightly granular, tasteless, solid fat. The skimmings and scrap from the lard-rendering kettles are strained, and the fat, about 2 per cent of the original charge, obtained from them added to the steam-rendered product. Several factories, however, use the ordinary steam and kettle-rendered lards, and not "neutral." Great cleanliness is observed throughout both processes, and there is very little manual handling, machinery being used as much as possible, and the fat carefully guarded from any source of contamination.

The by-products of oleo oil and neutral, viz.: stearine, tallow and lard, are standard merchantable articles. Only fresh and sweet fats are used, and tanks, etc., are thoroughly cleaned before use, as a small amount of fat, if allowed to adhere to the apparatus, is liable to decompose in such as way as to spoil the succeeding batch of materials worked up.

Though there may be slight differences in the details, the range of temperature, size of tanks, etc., pursued by the different manufacturers, the general procedure is as above described, the object being to obtain a neutral fat, melting at butter temperature.

The vegetable oils are prepared by crushing the seeds, etc., and subjecting the crushed mass to hydraulic pressure, or by extracting the oil by carbon bisulphide or other solvent. The crude oil thus obtained is refined to remove the coloring matter by treatment with mineral acids and subsequent neutralization by alkalies, and chilling and pressing, whereby a product is obtained of a light straw color and bland taste.

The butter used is always selected for its high flavor and taste, and is generally obtained direct from the creamery. Owing to the granular character of oleo oil it becomes necessary to add some softer and smoother fat; and neutral lard and cottonseed or other similar vegetable oil, are added for the purpose of making the mixture more closely approach the consistency of butter. The proportions in which these ingredients are used vary with the seasons of the year, the grade desired, and the formulas of the manufacturers. The charge of milk or cream, however, is the same for all grades manufactured by any particular factory, and varies from 10 to 20 per cent. The milk or cream is allowed to become slightly sour.

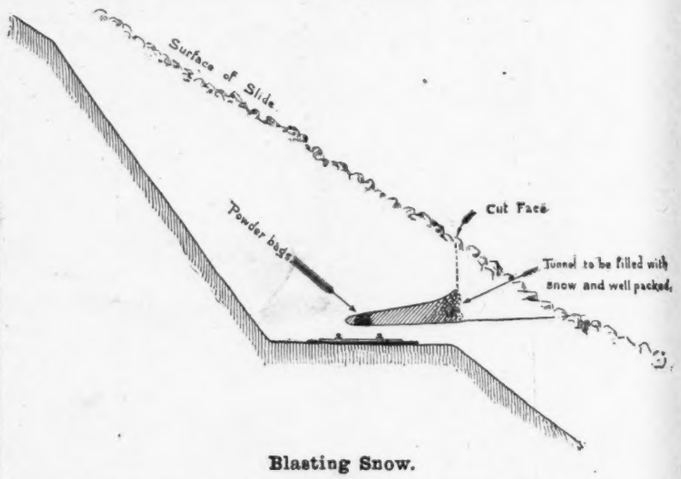
The churn used is steam jacketed, of 1200 to 2500 pounds capacity, and the whole operation of churning is conducted at a temperature of 85 to 105 degrees F., insuring the melting and thorough mixture of all the solid fats used, thus differing from ordinary creamery practice. The oleo oil and neutral lard are melted in separate kettles at a temperature of about 90 degrees F. The charge of milk or cream is first run in and the paddles kept in motion until the butter begins to form. Then the charge of melted oleo oil is added and stirred. When this is well incorporated the neutral lard is run in, and finally the annatto, to give the desired butter color. The butter is added either directly into the churn, being first melted, or it is worked into the oleomargarine after it is taken from the churn. The temperature is carefully regulated, being about 85 degrees F. at the beginning and gradually increasing to 105 degrees F. at the end, when the whole charge has the appearance of a yellowish, creamy fluid. From twenty to ninety minutes are occupied in the churning. The whole melted charge, after it has been sufficiently churned to thoroughly incorporate all the ingredients, is run either directly into tanks containing chopped ice and constantly stirred, or is met by a stream of ice-water as it issues from the churn. The object is to give the melted mass a fine grain by this sudden cooling. The chilled mass is removed from the tanks and placed on wooden trays to drain. Here the salt is added and allowed to work itself in, which generally takes from twelve to twenty-four hours. The salted mass is then thoroughly worked by mechanical rollers to remove the buttermilk and water, following the general practice of creameries in this and subsequent operations of packing, etc.

Oleomargarine is placed on the market either "solid packed" or in prints or rolls. Four grades are generally made, known as "dairy" and "extra dairy oleomargarine," "creamery" and "extra creamery butterine," the last two containing from 10 to 25 per cent of the best creamery butter. In the lower grades, from 25 to 60 per cent of neutral lard, from 20 to 50 per cent of oleo-oil, from 5 to 25 per cent of vegetable oils and in some cases from 2 to 10 per cent of butter, with 10 to 20 per cent of milk or cream, are the proportions used. Some factories employ no vegetable oils in their oleomargarine, preferring to use a larger proportion of neutral lard with a small amount of butter to obtain the desired butter consistency. In the higher grades the proportions of oleo oil are reduced, the vegetable oils are discarded, and creamery butter is used to make up the charge.

Hudson's Bay Railroad.—The question of the construction of the Hudson's Bay Railroad is now before the Manitoba Legislature, and the Government has decided to make an offer to Onderdonk, the New York railway magnate who is now promoting the scheme, backed by several English and German capitalists. About 300 miles of the line will run through Manitoba, and this section of it Premier Greenway announces will be subsidized to the extent of $2,000 per mile by his Government. This is $250 a mile better than the Government did for the Northern Pacific, which is now building branches in this country. It is possible the Government may be induced to guarantee bonds of the Hudson's Bay Road to the extent of $4,500,000.

THE SNOW SHEDS OF THE CANADIAN PACIFIC RAILWAY.*

When the last spike was driven in the Canadian Pacific Railway in November, 1885, no provision had been made for working the line through the mountains during the following winter. For construction purposes the rails had been laid as rapidly as possible, and the approach of winter suspended completion; but engineers were left behind provided with meteorological instruments, snow-shoes and dog-trains to determine the position, character and extent of the snow-sheds. The result of this first winter's inspection was the construction in the following summer of thirty-five snow-sheds, having a total length of four miles. The next winter, the first in which the line was opened for traffic, demonstrated that more sheds were needed, and that existing ones required lengthening in some cases, strengthening in others; that parapets over the portals, and glance-works on the mountain side above were needed to direct sliding snow over the sheds instead of between them. During the summer of 1887, the total length was increased to six miles, and the total number to 53. The experience of the past winter has shown that additions to the sheds are required to the extent of about 4,000 feet, bringing up the total length to about seven miles. The fifty-three sheds already erected embrace several types, the primary distinction being, first, those designed for snowfall alone and those exposed to avalanches; and, secondly (as between these last), those exposed to the avalanche on one side only, and those exposed to it upon both sides. These last are called valley sheds, are flat-roofed, and cost about $66 per lineal foot. The typical shed of the Selkirks is an avalanche one, with solid rock-filled crib-work upon the mountain side and strongly braced frame-work for its outer wall. The cost of these range from $40 to $70 per lineal foot, according to location, the increase being due to the greater mass of crib-work required where the avalanche is heaviest. The space between the crib-work and the mountain side is filled in so as to conduct the avalanche over the roof of the snow-shed, without striking heavily against it. The second important type is the gallery shed, which is without crib-work, but has its roof extended against the mountain



Blasting Snow.

side upon strong frame-work. The cost of these range from $15 to $40 per lineal foot.

A combination of the typical and gallery sheds is where crib-work is used as a foot wall on the mountain side. This is called "toe crib and gallery" shed, and costs from $27 to $54 per lineal foot.

The gallery sheds are generally extensions of the typical sheds on the flanks of the avalanche and outside its path, and where necessary are terminated by strong parapets as much as 10 feet high to prevent the overflow of the lighter snow from the wings of the avalanche. By means of these parapets 40 to 50 feet of shedding at each end is saved; and the same principle is adopted where slides come down narrow ravines, in which case the profile of the roof is a trough the width of the ravine. These are called "scoop sheds."

During the summer of 1886 fires denuded the mountain sides, leaving no support for the snow on steep side hills, increasing the number of slides and the demand for shed extensions. Sheds were lengthened at each end and connected together until the longest shed exceeded 3000 feet. Long sheds are objectionable, not only on account of the greater fire risk in summer, but in the handling of long freight trains on the heavy grades during the winter, when the sheds are entirely dark from snow fall and snow slides. The egress of smoke is then prevented, and brakesmen are unable to see signals or hear whistles. In order to limit the length of sheds and maintain as many breathing holes as possible, a system of glance-works was devised for the purpose of protecting the necessary openings between sheds. These "split fences," as they are called, are erected on the mountain slope above the track, and are constructed of crib-work or piles, or both. They are triangular in plan, with the apex pointing upward, and on the center line of the snow slides. From the solid triangle which splits the slide, wings are slightly curved and extended, until they pass the line of the shed portals, thus dividing the slide and diverting its course right and left over the sheds. Where there is danger of the snow filling up and overflowing this "split fence," a similar one is placed higher up to cover it. Where only necessary to protect one portal, a glance fence of triangular bents, sheeted with plank, and firmly braced at the back, is planted diagonally with the track, and terminated in strong crib-work at its lower end.

The first winter's experience, founded upon close observation of the character of the slides, proved most valuable in determining the location, design and strength of timber, in the two miles of sheds built the ensuing summer; and by the adoption of wider bents, smaller sized

* From Transactions of the American Society of Civil Engineers.

square timber and the more extensive use of the fine round timber, adjacent to the line, for posts and braces, much economy was effected.

The sheds are almost entirely built of cedar, but planking and timbers exposed to transverse strain are of the stronger Douglas fir (Oregon pine) so abundant in the mountains. The cedar in face of heavy cribs is 12 inches square, of lighter "toe cribs" 12 × 10 inches, the back 12 × 12 inches, flatted or round, with 3-inch spaces between the courses. Ties are round, and where the bents are 5 feet centers, break-joints in crib-work every 10 feet, being dove-tailed to the front courses and also to the back flatted timber ones. The saddle-joint is round, and the entire timber-work drift bolted together. Dowells are put in foot of plumb posts where gallery is upon toe crib. The joint at the meeting of rafter, plumb and batter-posts was, in the first work so framed as to leave a space for air between the planking of the roof and that on the batter-posts; but it was found unsuitable, because the snow in a slow traveling slide found its way to the track. The joint, as shown in all the drawings, is now used, although not as strong as the first one; the air space is covered by extending the roof, and is kept open until the heavy slides come, when all spaces are securely closed. On this account it is desirable to have the sheds as short as possible, and in view of the success of the split-fence system, suggested by the Vice-President and General Manager, Mr. W. C. Van Horne, it is probable that the longer sheds will be cut out at suitable points, and the openings covered by the split fence.

THE TELEGRAPH.—Where sheds are in close proximity, an underground cable is used to secure communication with headquarters in any event, and also promptly to locate the site of any interruption. At isolated sheds and suspected points, very high poles carrying the lines clear of all probable obstructions, are employed. The only interruption last winter was caused by wind storms, and the loss of time without communication did not exceed four hours.

FIRE PROTECTION.—There is a very complete system for fire protection in the Selkirks, stationary and locomotive, gravitation and pumping—stationary for sheds, and locomotive for bridges, buildings, timber, tie and wood piles and forest fires, as well as for the sheds. Water by gravitation is abundant, and flumes are erected on the roofs of isolated sheds, and supplied with running water from the nearest stream, barrels and ladders being placed inside. Where sheds are closer, pipe lines are laid with stop valves at each portal and tanks between, so that damage to pipe in one shed would not affect another. The same system applies to the longer bridges. For smaller ones the usual stationary barrels and buckets are provided.

For the locomotive and pumping system, tanks of 6000 gallons are kept on flat cars at sidings. Each engine has hose connected with the injector by a globe valve, and can draw from the tender or the portable tanks.

For further protection against forest fires, sand and gravel is dumped from a train around bottom of bridges, trestles, etc.

Where avalanches are expected, the line is thrown well into the mountain side, and the shed roof (which by law must afford a clear headway of 21 feet above the rails) is conformed by back filling as nearly as possible to the mountain slope. Where it cannot be thrown in far enough for this purpose, a broad bench of natural ground is left to take the impact of the avalanche, and send it a tangent to the roof of a comparatively light shed. When the ravines are too deep to be filled up the line is thrown out as far as possible, the ravine bridged with a clear span, the abutments being protected by a glance crib and split fence, and a highway is made for the avalanche to pass under the track.

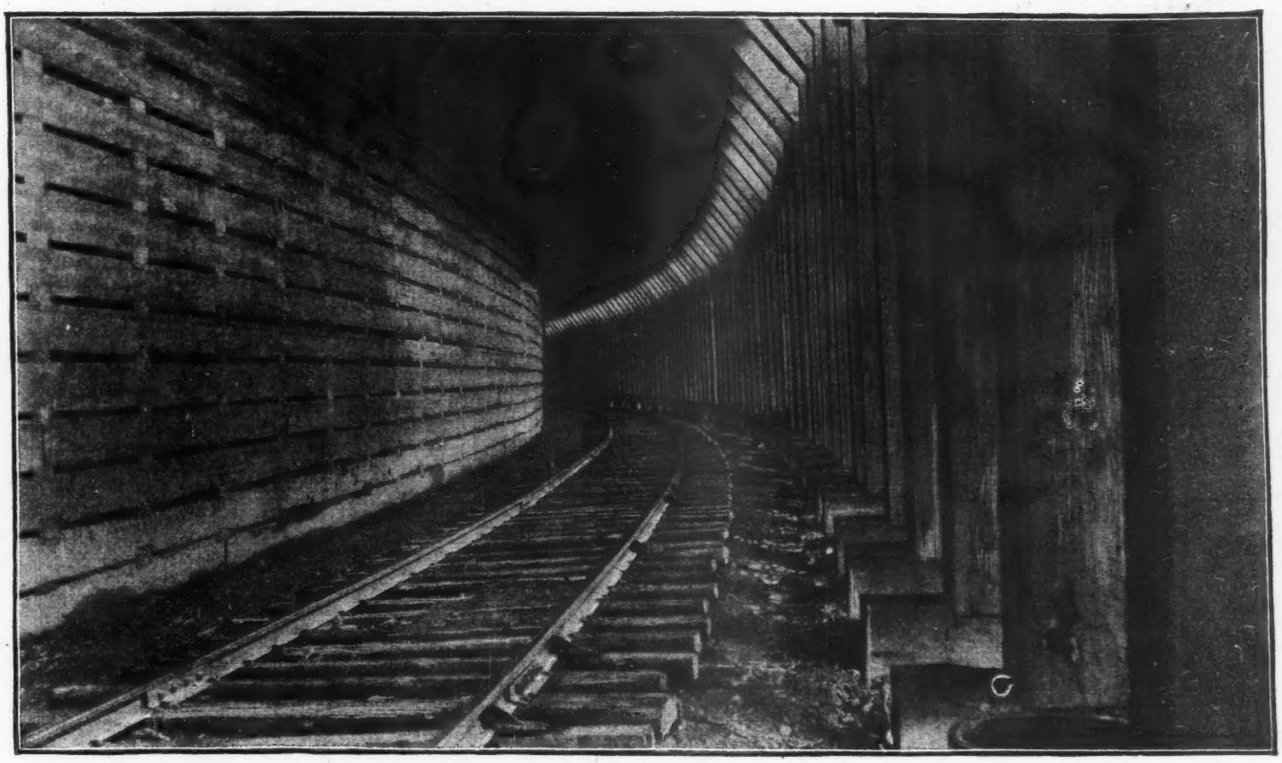
At the longer sheds an outside or summer track is maintained, both on account of the scenery, which is grandest in the shed region, and also to reduce the risk of fire.

In the 31,954 feet of sheds erected there were used 25,000,000 feet B. M. of sawed material, and 1,140,000 lineal feet of round timber; and the cost of these, including the necessary changes of line to provide for them, of filling in gulleys on the mountain side opposite them, and other work of snow protection, has reached about $2,900,000, and it is proposed to expend about $200,000 more to complete the system.

The sheds were subjected to a very severe test in the winter of 1886–87, which was more severe than any observed before or since, the snow fall being the heaviest recorded, exceeding 35 feet at the summit in the Selkirks. Eight and a half feet fell in six days, and for about three weeks snow was falling almost continually, and slides during this period were very numerous and constant. The sheds proved strong enough in every respect, although subjected to the weight of snow 50 feet deep, weighing 30 pounds to the cubic foot.

The warm Chinook winds and winter rains, followed by frost 30 degrees below zero at times, make the snow very heavy. It has been repeatedly weighed and varies from 25 to 45 pounds per cubic foot, the latter kind being compacted in masses of 5 to 15 cubic yards, and looking more like ice-floes than snow-balls.

Before the snow-sheds were erected, side cuttings on the slopes exposed to slides were obliterated by the latter, and the *statu quo* of the original snow slope was restored. The snow, which generally brought rocks and trees with it, was packed by the great pressure of the slide so as to be nearly as hard as ice. Black powder was found to work admirably in the hill-side cuts—huge masses being blown down the hill—and the remainder, in heavy blocks, was rolled over the side. In through cuts powder was used in heavy charges to break up the snow which was too hard for shoveling, except near the top. Picks and specially-designed ice-chisels were here used, and the cut was benched out, entailing a large amount of labor in casting.



SNOW SHEDS ON THE CANADIAN PACIFIC RAILWAY.

The sketch on page 212 shows the manner in which the powder was applied in side-hill cuts.

The force of some slides was shown by the experience of a valley or double crib shed exposed to them from both sides, the unfinished lower slide of which was left without the batter-post and sloping sheet of plank. When struck on this side, the crib, though filled with stone, was knocked a foot out of plumb, causing the rafter to buckle, the roof being torn off and carried 200 feet up the steep slope above the track. The inside of shed was filled up with snow, which was piled 30 feet deep above it. Then clearing out the shed, spaces large enough for a man to go through were found at several points, evidently the effect of confined air, and indicating the rapidity of movement which prevented its escape. Further evidence of air compression was found in the spaces between the wall timbers, which were caulked with snow so hard that no impression could be made upon it without using a pick. It is a question in this case, whether the roof was torn off only, or partly blown off by air concussion.

The sheds exposed to the descent of heavy trees, ice or rocks, have the roof double planked with intermediate rafters and posts. A

rock slide of 100 cubic yards passed over one of these, leaving a specimen rock measuring 128 cubic feet, about ten tons, on top of the roof. In this case the slope of the ground above coincided very closely with that of the roof, exposing the latter only to a rolling load.

The snow-slides vary in intensity from the quiet descent on the slope to the rushing avalanche, bearing rocks and trees, and accompanied, as it always is, with a terrific cyclone more dangerous than either. They sometimes bring down a quarter of a million cubic yards, and are governed by the moist or dry condition of the snow, by the varying slope of the mountains, the presence or absence of trees, and of sloping crests many thousand feet above grade in the region of eternal snow and of maximum precipitation.

The avalanche is "made up" by excessive snowfall 4000 to 5000 feet above the level of the track, and "pulls out" over the sloping surface of a glacier, or of old packed snow of the previous winter, until it reaches the steep grade (in some cases at an angle of 70 degrees) and then there is a roar, a crash, a flying scud of snow, and all is over. Its maximum velocity can only be inferred from the imprisoned air spaces already mentioned, and from the force with which a tree was driven through a shed, where it penetrated the backing, the roof and the solid rock-filled crib-work, knocking out a plumb post in its passage, and was sawn off 10 inches in diameter at the face of the crib. At some points the avalanches cross the valley and ascend the opposite slope to the extent of 200 or 300 feet. Sheds on a track located over 100 feet above the valley have been struck by avalanches from the opposite side which ascended the slope, passed over them, and climbed the mountain side, 150 feet above their roofs.

Remarkable effects are produced by the local cyclone or hurricane induced by the swift avalanches. This sometimes extends for 100 yards outside the course of the solid avalanche and is called the "flurry," because it is clouded with particles of fine snow. If the course of the avalanche is diverted by some natural obstacle, the flurry drives on in the line of original motion, snapping off huge trees several feet in diameter, at heights 50 feet or more above the ground, without uprooting them. Some in the vortex of the flurry are uprooted, but the majority are cut short off, as they would be by chain-shot, and so far from the line of the avalanche that there is nothing to indicate the cause of their decapitation but the snow, impacted like moss against the windward side of their huge trunks. The flurry whirls upward to the height of 100 feet above the descending snow, and forward in advance of it when under full headway, presenting a magnificent spectacle to an observer at a safe distance. December last it picked up a man, and whirled and twisted him so rapidly and spirally, that when dropped he was a limp mass, without a bruise or break in skin or clothing, yet with all his bones broken or dislocated.

Bridges which have been substituted for trestles carried away by slides are anchored by guys to "dead-men" in the ravine, and thus secured have successfully resisted the "flurry," which, although it caulked the chord spaces very tight with hard snow, did no damage to the structure.

With three-quarters of a mile addition to the snow sheds, Mr. R. Marpole, the experienced and capable superintendent of the Pacific Division, is confident that interruption to traffic in the Selkirks will be limited to hours instead of days, as has been the case heretofore; and be chiefly the result of local damage to sheds from rocks or trees brought down by the avalanche.

The avalanche season—though a lively and brilliant one—is short in comparison with the glacier one, and when the exposed points are all protected, interruptions due to the environment will have little appreciable effect upon the general traffic of the year. There will be an exceptional item for maintenance here in excess of any other division of the road, but I believe it will be fully met by the exceptional attractions of this glacier section. The avalanche may attract hundreds of bold admirers for two or three months of winter, but for the greater portion of the year the silent, majestic glaciers, which may be approached without risk, will draw thousands of tourists into the Selkirk range, where there is no danger when there is no snow in motion.

COST OF STEEL MAKING IN ALABAMA.

By Phillips & Claghorn, Mining Engineers.

A recent article in the *Manufacturers' Record*, entitled "Steel at $16.90 a ton," seems to call for some comment. The figures are given as applying to the Birmingham District, and have occasioned considerable discussion here.

Mr. Ernst Prochaska, metallurgical engineer of this city, is responsible for the statement. He was formerly connected with the Basic Bessemer Works at Teplitz, Germany, and was with the Pottstown Iron Works for nearly two years. His experience covers nearly ten years; and he is thus entitled to speak with authority. He gives no estimates for basic Bessemer, but for open-hearth basic his figures are as follows:

COST OF BASIC OPEN-HEARTH STEEL.

	Price per gross ton.	Per cent.	Amount used.	Price per gross ton of steel.
Ferro-manganese	$60.00	5	11·21 lbs.	$0.30
Coal	1.50		1,000 "	.67
Magnesite	30.00		80 "	1.07
Lime	1.00	7	157 "	.07
Refractories, bricks, sand, clay				.60
Molds				.40
Repairs and running				.50
Waste and oil				.10
Wages and salaries				2.00
Interest on plant, 6 per cent on $50,000, $3,000				.10
Cost of conversion				$5.81
Pig iron	$8.00	60	1,424 lbs.	$5.00
Scrap	17.00	30	742 "	5.04
Ore	.50	10	237 "	.05
Cost of charge + 6 per cent waste			2,373 "	$10.09
Cost of conversion				5.81
Royalty				1.00
Total cost				$16.90

Steel ingots at $16.90 present an attractive appearance, so attractive in fact that many hard-headed business men are falling in love with them. Whether or no this is a case of love at first sight, and whether the feeling is reciprocated, we would not venture an opinion. Let us, however, examine these figures a little more closely. As to the cost of conversion, that depends almost, if not altogether, as much upon the management of the works as upon the quality and cost of prime materials. Given a pig of a certain composition suitable for conversion in a basic open hearth, one set of men will convert it more cheaply than another set. They will have had more experience, will understand the handling of men and machinery to better advantage, are in a word, better business men. The highest item in Mr. Prochaska's estimate for conversion, outside of materials, is wages and salaries, $2 a ton. This may be high or low, just as we regard it. The cost of labor depends not upon its price per day, but upon its effectiveness. Some labor in this district is high priced at $1 a day, for it is really worth only 75 cents, while under other conditions it many be low-priced, because it is really worth $1.25. While under the most favorable circumstances Mr. Prochaska's estimate for conversion may be just, and may indeed be taken from his actual experience elsewhere, we should not forget that it depends in great measure not so much upon the cost of materials as upon the management of the materials after they have been purchased. His estimate for repairs and running, waste and oil, wages and salaries amounts to $2.60, or very nearly 50 per cent of the total cost of conversion. In other words nearly 50 per cent of the cost of conversion is charged to the very things that are subject to wide variations, and which must suffer such fluctuations as long as the old doctrine of man's fallibility remains in force.

When it comes to the cost of the pig used, we reach a subject about which little is actually known outside of the furnace company.

Mr. Prochaska charges it up at $8. This means, of course, that it is made for less than $8, unless the furnace men will sell at a loss. Take it at $8: Is any one in Alabama willing to say that pig has been made here for twelve months at a time for even $8, to say nothing of making it for less? We are aware that it is said by one who is in a position to know that pig can be made here for less than $7.50, and further, that some actual returns of $7.83 have been attained. But until more definite information is accessible we can not think that even $7.83 can be reached by a run of six or twelve months. Speaking of these figures to an exceedingly well informed iron-master of this district, he remarked that he had no confidence in them as representing actual results. The latest quotations here for mottled pig are $10 at the furnace, with gray forge at $11 and silver gray at $12. Allowing that mottled pig can be used for conversion, and taking actual quotations we find that the cost of the pig used would be $8. instead of $5, which would increase the cost of the steel ingot to $17.90. A difference of even 50 cents on the ton of pig represents, for a 10-ton steel furnace, $3000 a year, which is the interest on $50,000 at 6 per cent. That is to say, if the pig costs $8.50, the additional expense would amount to as much as the interest on the original investment, and this means that with interest at 6 per cent the company must have a capital of $100,000 instead of $50,000. Now, we would ask, is any Alabama furnace prepared to sell mottled pig for $8.50, and will they guarantee that it is suitable for conversion by the basic open-hearth process?

We respectfully submit that mottled pig at $8 or even $8.50 may indeed be among the possibilities of this district, but is not among the actualities. Whether or no good foundry pig can be made in the Birmingham District "at a cost not to exceed $9 a ton," as seems to be asserted by Mr. Goldsmith B. West in the *Manufacturers' Record* of February 2d, is not for us to discuss at present. The cost of Southern pig irons cannot now be given. It may be $8, or $8.50 or $9. An outside opinion is not reliable, unless backed up by returns from actual work covering not one month, or two, but six and twelve. It is not unknown that the system of bookkeeping sometimes makes the cost appear less than it really is.

The true way of dealing with the question of steel-making in this district, as Mr. Andrew Carnegie remarked in a brief speech here yesterday, is to build a steel furnace. Mr. Carnegie may always be depended upon to hit the nail on the head. To settle the question of how much it will cost to make steel here we must make it. We have about reached our limit as a pig-iron district; to reach out toward a higher level we must make steel. Upon this depends our future, and we have only ourselves to look to. We cannot expect to secure help elsewhere. If Birmingham wants steel-works she must build them herself, and we note with satisfaction the beginning of a discussion which must bear good fruit. So far as we are aware, Mr. Prochaska's estimates for steel-works here are the first detailed figures that have been made, certainly they are the only ones that are entitled to any consideration. He has had a good experience in basic steel, and is qualified to speak on this subject. He must, however, look at things as they really are, and not at what we would like them to be. The experiments that have been made here by the Henderson Steel Company have shown what perhaps was not disputed: that steel can be made from our pig, but the main question is still in abeyance, viz: the cost of making it. It is greatly to be desired that this company inform some competent expert of the cost of making their steel, so that he might be in a position to investigate the subject for himself, and render valuable aid in putting the industry upon an assured foundation. We hear of sales of their steel at $25, though it has sold for more.

Mr. Prochaska informs us that he adopted the price of $8 for the pig at the suggestion and request of a prominent iron-master of this district, who said he could furnish it for that amount.

The pig most suitable for basic open-hearth is not made here. The white iron best adapted for the process should have the following composition.

Carbon	immaterial
Phosphorus	0·05 to 1·00
Sulphur	0·10 (upper limit)
Silicon	0·5 to 1·00
Manganese	0·8 to 1·50

A movement is now on foot to secure the $50,000 necessary for a basic open-hearth plant. Further particulars will be given later.

BIRMINGHAM, Ala., February, 1889.

WOOD CLOTH.

Mitscherlich has applied the bisulphite process for reducing wood to the production of a fiber from wood which can be spun.

Thin boards or laths free from knots, but of any desired width, are cut into strips in the direction parallel with the grain, and are then boiled in a boiler containing a solution of sulphurous acid or bisulphite. This boiling effects disintegration without requiring that the strips of boards shall be reduced to very small pieces. After boiling the wood, it is dried in the open air or in specially constructed drying rooms. By thus drying the product, the fiber which is originally very weak, and tends to break at the slightest strain, becomes comparatively strong and does not resume its very breakable condition on the addition of water. The operations are carried out as follows:

The damp masses on the frame are transferred to a traveling endless cloth, which leads them to a pair of rollers, which may be plain or provided with corrugations in the direction of their length, the ribs of the one roller being made to gear into the recesses of the other one, whereby they effect a simultaneous strong bending and squeezing of the masses. The cutting of the material in passing through the corrugated rollers is avoided by causing the endless cloth to pass over the lower roller and by placing a canvas covering around the upper roller. The pressed masses fall from these rollers on to a second endless cloth, which conveys them to a second pair of rollers, from which they are conveyed to a third pair, and so on, they being preferably pressed in this way six times. By continued treatment of the wood the fibers become at length so pliable and isolated from each other that they can be employed directly for coarse filaments. For obtaining a perfect isolation of the fibers, however, without material deterioration, these operations alone are not suitable, and their special purpose is to loosen the fibers in the transverse direction, so that in the following operation a thin, long fiber may be obtained. For this purpose the boiled and pressed masses are completely dried. After drying they are combed in the direction parallel with the fibers by means of devices provided with pins or teeth, in a manner similar to the operations for combing flax, cotton, etc., but with the difference that the pins or teeth of the apparatus must be made very strong. The separation of the extractable matter from the fiber produced by boiling the gums and soluble organic matter can be effected at any time. It is, however, preferably effected after the fiber has been spun into threads, etc.

AMERICAN INSTITUTE OF MINING ENGINEERS.

The following is a brief abstract of the Annual Report of the Council, presented at the New York meeting:

The receipts for the year from all sources, including the balance at the beginning of the year, were $24,937.47 and the expenditures $19,057.19, leaving a surplus of $5,880.28. In addition to this, the Treasurer holds United States bonds to the par value of $7,300, of which the present market value is about $9,000. The total amount of cash on hand and securities at par is $13,180.28, or, reckoning the securities at present market value, nearly $15,000.

Since the balance from the last statement was $4,615.15, the actual receipts of the year were $1,265.13 greater than the expenditures.

The report mentions as a special expenditure during the year, for the benefit of members, the publication and free distribution of a volume containing the Index of Vols. I.–XV. of the Transactions.

Altogether the issue of this general index has involved an expenditure (during two years) of about $2,500. That it was not only a useful undertaking—perhaps the most useful to which that sum could have been devoted for the advantage of members—but also a wise business operation, is proved by the increased receipts from the sale of publications during the past year. The possession of such an index greatly enhances the convenience, and therefore the value, of the Transactions as a cyclopædia of modern knowledge and practice in the professions which they cover.

[The present membership is: Honorary members, 11; "foreign members," 45; members, 1606; associates, 168; total, 1830. The "foreign members" in this list were elected before 1880; all members elected since that time, wherever they reside, are included in the general list. To the total of 1830 given above must now be added 95 members and associates elected at the New York meeting, making the total membership of the Institute at this time 1925. The total reported in the last annual report was 1714.—ED. E AND M. J.]

Coke Concrete.—Concrete made from coke braze, cement and river ballast has proven a great success in London building operations.

Forest Conservancy in India.—The area of reserved forests has increased from 48,765 square miles in 1884 to 52,923 at the close of 1888, or at the rate of about 800 square miles a year.

SNOW SHEDS ON THE CANADIAN PACIFIC RAILWAY.

Every Boiler Plate Must be Tested.—An order of interest to boiler makers is to the effect that hereafter every single plate used in the construction of a steam boiler for the government must be tested. Heretofore, three or four plates out of the whole number for one boiler have been tested.

The Ruby Mines in Burma.—In connection with the lease of the Burma ruby mines, which has been granted to the Streeter-Rothschild Syndicate for a term of seven years, or two years longer than was originally tendered for, we believe that the only point of detail now to be settled is the date from which the lease should run.—*Indian Engineering.*

Carrying Live Fish in Railway Cars.—The iron railway car constructed by two Danish engineers for carrying live fish has proved a success. The car contains two chambers, into which the fish are deposited in water tanks. It is said that experiments are now to be made with sending live fish in this car from Denmark as far as Switzerland and Italy.

Electric Motor Patents.—The Commissioner of Patents at Washington, on the 25th ult., heard argument of counsel in the interference case of Field against Hall against Siemens against Greene, which involves the important question of priority of invention of the application of electricity as a motive power, as used on electric street and other railways. The case came before the commissioner on appeal from the Board of Examiners in Chief, who awarded priority to Greene.

The English Salt Trust is not to be without competition. In addition to the new works at Winsford, recently started, twenty-seven acres of land have been purchased within a few hundred yards of the Salt Union

brine shafts, and operations for sinking a shaft have been commenced by a London syndicate. On adjacent land another similar venture has been started, a body of Widnes chemical manufacturers having bought what is known as the Witton Hall estate for a like purpose.

Electric Railroad Crossing Signal.—An apparatus very necessary in Germany and Holland for warning travelers of an approaching train at road crossings has been constructed by Messrs. Siemens and Halske. By an electrical arrangement a bell begins to ring violently at the crossing when the train is 1500 yards therefrom, and continues ringing till the train has passed. The apparatus is particularly intended for the light or second-class railways in Germany worked by omnibus trains, where such crossings are not guarded.

Re-cutting Files by Electricity.—Files can, it is said, be recut by cleaning them in acidulated water between two plates of carbon and closing the circuit so as to form a real voltaic cell. The hydrogen liberated clings to the points of the teeth of the file, protecting them from further action, but the cutting action proceeds freely over the remainder of the file. This process speedily brings back the teeth of an old file to the original shape and dimensions, and does not merely sharpen them, but practically recuts the file, without necessitating either softening or re-tempering the metal.

Movable Bottom Coke Ovens.—The Adams Coke Bottom Manufacturing Company is erecting a number of experimental ovens at Mansfield, Pa. The company, which has been organized with a capital of $5000, has received its charter. The ovens are constructed with a false bottom that is worked by hydraulic pressure. They claim that it will be an immense saving in labor. At the present time one man is able to draw from three to four ovens per day. The system will enable one man to draw twenty-five ovens per day. Another advantage is that the ovens are not dampened when the draw is made. A new bottom can immediately be put in and four drawings can be made instead of three as at present.

The Coming Oil Age.—From a new pamphlet on petroleum, entitled, "The Coming Oil Age," about to be published by Mr. Charles Marvin, it appears that although the first well was only sunk thirty years ago, the annual production of mineral oil now amounts to about 2000 million gallons in America and Russia, employs a fleet of nearly 150 tank steamers, circulates through 7000 miles of pipe lines, and is used instead of coal by nearly 1000 locomotives and steamers. These and other remarkable features of the growth of the petroleum trade are described by Mr. Marvin, who has also included in the pamphlet the results of his studies at the Petroleum Exhibition at St. Petersburgh last year, and the lectures he recently gave before the Royal Engineers at Chatham at the request of the Government.

Compound Armor vs. Steel Plate.—The long-continued experiments which have been conducted on board the the "Nettle" at Portsmouth, with the view of determining the respective merits of compound armor and of solid steel armor as a protection for battleships, have just been brought to a close. Only two Sheffield manufacturers sent in compound samples for competition, but the number of steel plates forwarded for trial amounted to eight, from as many makers, being two less than were expected. The 10-inch plates were attacked by steel and Palliser projectiles, at a range of 30 feet, and although two of the solid steel armor plates at least underwent the crucial ordeal with satisfactory results, the superiority remained with the steel-faced armor now adopted in the Navy.

New Mexican Cable.—The new Mexican cable is to be used for the South American traffic, the present cable between Vera Cruz and Galveston being used exclusively for Mexican business. The Mexican Telegraph Company has arranged to lay the new cable in conjunction with the South American Telegraph Company, which has a line across the Isthmus of Tehuantepec. The increase in the South American business has become so extensive of late as to make it impossible to handle both that traffic and the Mexican business upon the present Mexican cable. The new cable will be laid from Coatzacoalcos, about 260 miles south of Vera Cruz, to Galveston, a distance of about a thousand miles. The steamer "Faraday" has arrived with the new cable, which is said to weigh about three tons to the mile.

New Method for Preserving Milk.—At a recent meeting of the Agricultural Society of France, M. Guerin, of Grandvilles—Vosges—read a paper on a new method of preserving milk. He showed that when it was frozen milk could be transported with the greatest ease, and that after being kept for days and weeks, and then simply thawed out, it retained all the characteristics of fresh milk. The paper dealt first with the method of freezing, which could be carried out in the ordinary ice machines if done on a sufficiently large scale, and then described the experiments made to ascertain the precise temperature at which the best results might be expected. The appearance and taste of the milk after undergoing the process, when thawed, were so exactly those of new milk that in an assemblage of twenty persons not one could perceive the slightest difference. In cooking, yield of cream, and every other respect, the frozen corresponded with quite new milk, and on the fourth day the cream was still excellent.

Cork Springs for Cars.—M. Germond de Lavigne, of Paris, has made experiments which show that if a piece of cork 15 mm. thick be compressed between the jaws of a vise till it be reduced to a thickness of 5 mm., it will, when released, recover its original dimensions in ten minutes. As an application of this property, the Lens Colliery Company have adopted cork as a spring to the coupling hooks of their coal wagons. The stem of the hook passes through a set of twelve disks, each of 175 mm. in diameter and 15 mm. thick. The traction service with these springs is very satisfactory, from the several points of view of constant elasticity, durability, and cost of maintenance. Lately some trials have been made of these springs by the Northern Railway Company. The disks, in a group of twelve, when subjected to a pressure of 1100 kilo. per square centimetre, were found to be compressed in the proportion indicated above. On the pressure being removed, they recovered their original dimensions in exactly ten minutes.

Electric Heating.—The *Electrical Review* says: "One of the electrical projects in the air at the present time is the problem of heating dwelling houses electrically, without the use of any very hot substance. It is claimed that wall paper can be made in such a way that the passage of currents of low electromotive force will heat it moderately warm to the touch, and thus diffuse throughout the room an agreeable temperature. This is, of course, theoretically possible, and may even become feasible in a more improved state of the art. A source of warmth coming from the entire surface of the room would certainly be the perfection of house heating. Why may not the artificial illumination of the future be of the same nature? Recent developments are tending towards the possibility of infinite subdivision. The charm of a room illuminated with myriads of candles is one never to be forgotten, though it is one which few of the present generation have seen. We predict that the ultimate use of the glow lamp for domestic purposes will be to diminish its size and increase its number."

Effect of the Alien Act on Mining.—Mr. Stewart presented to the Senate February 27th the report of the committee on mines and mining on the ownership of mining lands by aliens in the territories—a subject the committee was instructed to investigate. The report of Ivan Michel accompanies and illustrates the report of the committee. The committee reports that there is invested in mining lands in the territories by aliens about $20,503,705, which has paid in dividends about $4,737,800. The profits may have been greater than this, but certainly the original capital has not been returned to the investors. The investment of foreign capital in the mines of the territories before the passage of the act prohibiting such investments consisted in the purchase of patented claims. The purchasers usually paid a full consideration and frequently exorbitant prices for this property. The money they bought in helped to develop the country. The people of the territories, the committee says, do not object to the investment of aliens' capital, but rather invite it, and the committee thinks it would be as well if the law in relation to the matter were repealed.

An Electrolytic Method of Liquefying Gases has been described by H. N. Warren—*Chemical News*, 58, 127–128. Strong hydrochloric acid is introduced into a combustion tube, bent at right angles, so as to cover two small platinum plates fused into the closed end of the tube; a plug of asbestos, saturated with concentrated sulphuric acid, is placed at the bend; the open and shorter arm is then fused up and immersed in a freezing mixture. On the passage of a current through the plates, gas is evolved and liquefies at the other end; but on removing the tube from the freezing mixture and discontinuing the current, the liquefied hydrogen chloride is reabsorbed by the water. The experiment may then be repeated. Other compound gases behave in a similar manner. When acidified water is decomposed in this apparatus, and a platinum plate covered with platinum-black has been fused in the short end, explosions occur there at intervals, and small quantities of water form, containing hydrogen peroxide, and having an ozonised odor. With chromic acid and water, the blue oxide of chromium is obtained. The method has also been applied to the liquefaction of oxygen and hydrogen, and the latter is said to have been "decidedly liquefied."

"American Style" Necessary to Sell Foreign Tools.—As illustrating the importance of such apparently small matters as the method of packing goods for foreign trade, and as further testimony from our rivals to the quality of American goods, we make the following extract from a letter in the London *Ironmonger* from a Birmingham (England) tool manufacturer. We would merely suggest that the genuine American article is still better for the purchaser than the imitation "American Style."

To the Editor of "The Ironmonger."

"Your correspondent referring to 'Trade in South Africa,' is quite correct in his statement about the packing of picks in cases of two dozen each; but the inference to be drawn is that it is only done by the American makers, whereas this plan has been adopted by me for some years past, and has found much favor with buyers. In addition to the uniform quality *and American style of finish* of my picks, it has been a very important factor in increasing the demand for these tools, repeat orders for which I am receiving through the merchants by every mail, and also for the *American style of axe-pattern, claw,* and *shingling hatchets*, which are always packed in quantities of four dozen each in cases made carefully to fit. The same remarks also apply to the Australian and New Zealand markets."

India-Rubber Supply.—The requirements for India rubber being now so large, it is satisfactory to know that the India-rubber trade on the Chindwin, in Burmah, although it has only existed for a year, has increased to such an extent that the local government has placed a large export duty on all rubber passing Kendat, the first revenue station on the way to the seaports, besides imposing a licence costing ten rupees per annum on all brokers or buyers of the article. According to a recent report, rubber is extracted from the *ficus elasticus*, which is similar in apperance to the banyan tree, except that the leaves are larger and of a darker color. Each tree is tapped daily during the season, which extends from November to June, nothing being done during the remainder of the year. In April, 1887, a Chinese syndicate at Bhamo received a monopoly for the extraction of rubber in the Mogoung district. This expired last October, and since then the trade has been thrown open to all. On the Chindwin the trade is in the hands of an English company, which, in spite of vigorous opposition from the Chinese traders, is working satisfactorily, because the natives prefer dealing with the Europeans. All the transport is carried on by native boats down the Chindwin to Kendat, where the rubber is transshipped into steamers. The system of collecting is to send a contractor with a sum of ready money to all the villages in a particular district to make advances to the head men, who, in their turn, send the villagers to the forests to extract the rubber, so that month by month each station has its own stock. This is bought for cash and sent down the river, the head men keeping the advance for further operation.

Hints to Exporters.—A foreign merchant at Pernambuco gives *Kuhlow's* some details of the usages and customs of that market which are of interest to those who are concerned in this industry. The cotton harvest begins on the 1st of August, and runs through the entire year till the 31st of July following. Throughout the whole of this time arrivals daily appear in the market, and the average of the monthly exports varies very slightly during the year. Orders may, therefore, be placed at any period. Direct copper shipments to Havre may be made by the steamers of the Compagnie des Chargeurs—Reunis, or in fact by steamers and sailing vessels of any nationality. The latest freights have varied between 30 f. and 50 f., plus 10 per cent. The average term of the voyage is from 18 to 20 days by steamer, and from 40 to 50 by sailing. The total production as shown, from the last three crops, is as follows: 1885–85, 161,000 bales; 1886–87, 319,000 bales; 1887–88, 302,000 bales, the last two showing a very marked improvement over the previous yield. Only a few years ago the yield did not exceed 100,000 bales. The weight of a Pernambuco bale varies according to the district and facilities for transport. Near the coast the bale is from 90 to 100 kg., while further inland it is from 70 to 80 kg. Bales from the northern ports, coming over sea, vary from 60 to 70 kg. The classification, known in Pernambuco as *prima sorte*, comprises strong fibre and fair or weak fibre, and bales generally contain a fair assortment of each, though the average sometimes varies. Shipments for Russia are now exclusively manipulated by German firms. The reis is the currency, which on the exchange averages just now about 250 to the franc, but it is occasionally subject to disastrous fluctuations. Purchases are generally settled by bills on London or Paris, or by bankers' acceptance against shipping documents. The metric system is universally applied, and cotton quotations are per 15 kg.

Photometers.—At a recent meeting of the Berlin Physical Society Dr. Lumner spoke on photometers, and specified the following requirements in their construction: (1) The surfaces whose brightness of illumination is to be equalized must not be separated by even the narrowest intervening space; (2) the outline of the surfaces must be sharply defined. An ideally perfect photometer ought to reflect no light from its grease-spot, and be impermeable to light over the rest of its surface. When a drop of Canada balsam, whose refractive index is very nearly the same as that of the glass, is placed between the opposed hypotenuse surfaces, total reflection is done away with at the place where the drop lies, and thus by illumiuation from one side only either a bright spot is seen on a dark ground or a dark spot on a bright ground. When the illumination is made from both sides equality of illumination can be easily estublished by adjusting the relative distances of the sources of light until the spot disappears entirely. The drop of Canada balsam very soon loses its sharply-defined edges, hence some other mode of procedure became necessary. The central portion of the hypotenuse surface of one of the total reflection prisms was left untouched, while the rest of the surface was ground to a slightly spherical shape. When the surfaces of the prisms were now firmly pressed together light passed without hindrance across the point of close contact of the surfaces, whereas it was totally reflected at all other points. By this means an ideally perfect "grease-spot" was obtained, which was permeable to light but reflected none, while the surrounding area reflected light completely and allowed none to pass through. A third method for obtaining an ideally perfect grease-spot consisted in etching figures on one of the reflecting surfaces of the prisms; the etched portions were perfectly transparent, the rest of the surface reflected light completely. The speaker exhibited photometers constructed according to the above methods, and proved theoretically that the ideally perfect grease-spot bears to the real one the ratio of 1 to 2, according to the constant determined in the Imperial Physico-Technical Institute. The sensitiveness of the new photometer is about 1 per cent.

Implements for China.—If the Chinese are as shrewd and 'cute as they are generally said to be, there ought some day or other to be a very large demand from that country for foreign agricultural implements. The Chinese are great agriculturists and gardeners, but they work with extremely antiquated and inefficient tools, and labor incessantly upon their land with relatively poor results. They thresh grain either with flails or by means of a stone roller, and then dress it by tossing it in the air in a slight breeze. They gather all sorts of refuse for use as manure, and irrigate their fields in the most patient and painstaking manner, but do all by hand. The American Consul at Peking, describing the agriculture of the North of China, says: "Chinese agricultural implements are of the rudest character. They are, chiefly, the plow, the hoe, the harrow, the rake and the stone roller. The plow is simply a broad blade fastened to a rough handle, guided by a man and drawn by teams of the most miscellaneous description; it cuts a furrow never more than 6 inches deep, and frequently only 2 or 3. The teams are made up of horses, donkeys, mules, bullocks and human beings, it being not unusual to see a man or boy and any one or more of the animals above named drawing the same plow. Chinese farmers measure the depth of the furrows by the fingers, and frequently speak of plowing only 2 or 3 fingers deep. The reason of this seems to lie in the difficulty of making a deeper furrow with their plows, and not because they are unaware of the advantage of it. The hoe is a much more effective tool, and it is with this that they work between the furrows of grain after it has sprouted. Foreign agricultural implements, especially plows, might be introduced with good effect among the Chinese, except that the price would deter all but very few from buying them. A Chinese plow can be bought for the equivalent of two or three Mexican dollars, and smaller tools in proportion. There are no great stores devoted to the sale of agricultural implements as with us, they being made by hand, either by a neighboring blacksmith or by the farmer himself, as occasion demands." The corn is ground in mills of primitive construction, worked by hand, horse, or donkey power. In sowing, all cereals are planted in furrows, wide distances apart, vegetables being planted in the spaces between the furrows. These particulars show that there is a great market in China for our implements if we can manage to introduce them into that country. With so conservative a people this may be a task of no little difficulty, but the magnitude of the possible demand is such that it is quite worth while to make the experiment.—*Ironmonger.*

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and for that of book-buyers, give the retail price? These notices do not supersede review in another page of the Journal.]

A Treatise on Hydraulics. By Mansfield Merriman, Professor of Civil Engineering in Lehigh University. Published by John Wiley & Sons. New York, 1889. Pages, 381. Illustrated. Price, $3.50.

Assaying in Three Parts. Part 1st. *Gold and Silver Ores. Second Edition.* By C. H. Aaron, Metallurgist, San Francisco. Published by Dewey & Co., San Francisco, Cal. 1889. Pages, 130. Illustrated.

A General Formula for the Uniform Flow of Water in Rivers and other Channels. By E. Ganguillet and W. R. Kutter, Engineers, Berne, Switzerland. Translated from the German, with numerous additions, etc., by Rudolph Henning and John C. Trautwine, Jr., Civil Engineers. Published by John Wiley & Sons, New York, and E. & F. S. Spon, London, 1889. Pages, 240. Illustrated. Price, $4.

DIVIDENDS PAID BY MINING COMPANIES DURING FEBRUARY AND SINCE JANUARY 1ST, 1889.

NAME OF COMPANY.	Paid in Feb.	Paid since Jan. 1st.	NAME OF COMPANY.	Paid in Feb.	Paid since Jan. 1st.
Aspen, Colo.	40,000	80,000	Hecla, Mont.	15,000	30,000
Alma, Idaho	.....	15,000	Idaho, Cal.	23,250	46,500
Atlantic, Mich.	80,000	80,000	Mt. Diablo, Nev.	.....	20,000
Boston & Mont., Mont.	200,000	200,000	Montana Lt., Mont.	.....	41,250
Caledonia, Dak.	8,000	16,000	Navajo, Nev.	10,000	20,000
Calumet & Hecla, Mich.	500,000	500,000	N.Y. & Hond. R., C.A.	15,000	30,000
Central, Mich.	40,000	40,000	Ontario, Utah	75,000	150,000
Colorado Central, Colo.	13,750	13,750	Osceola, Mich.	50,000	50,000
Cons. Cal. & Va., Nev.	108,000	216,000	Parrott, Mont.	.....	18,000
Copper Queen, Ariz.	70,000	70,000	Poorman, Colo.	.....	15,000
Daly, Utah	37,500	75,000	Quincy, Mich.	200,000	200,000
Dunkin, Colo.	.....	10,000			
Granite Mt., Mont.	100,000	100,000	Total, 25 companies.	1,610,500	2,086,500
Homestake, Dak.	25,000	50,000			

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

PATENTS GRANTED FEBRUARY 26TH, 1889.

398,373. Machine for Tempering Clay. M. Bierline and Jacob Bierline, Chaska, Minn.
398,381. Rail Chair. Henry F. Cox, Altoona, Pa.
398,384. Coal Gas Condenser. Frederick J. Davis, Waltham, Mass.
398,406. Amalgamator. William Johnson and Garey W. Johnson, Portland, Ore.
398,418. Means for Automatically Regulating the Flow of Liquid Fuel to Injector-Burners for Steam Boilers. Allen D. Linn, Racine, Wis., Assignor to Thomas Kane, Chicago, Ill., and the Racine Hardware Manufacturing Company, Racine, Wis.
398,443. Furnace for Heating Metals. Clement Payen, Philadelphia, Pa., Assignor to the Electric Storage Battery Co., Gloucester City, N.J.
398,448. Pipe-Coupling. William G. Richards, New York, N. Y., Assignor of one half to George H. Benjamin, same place.
398,450. Art of Protecting the Interior Walls of Furnaces. Henry Roberts, Pittsburg, Pa., Assignor of one half to George T. Oliver, same place.
398,451. Iron Column. Thomas F. Rowland, New York, N. Y.
398,456. Engine. John A. Secor, Brooklyn, Assignor to the Secor Marine Propeller Company, New York, N.Y.
398,457. Alternate-Current Electric Motor. Oliver B. Shallenberger, Rochester, Assignor to the Westinghouse Electric Co., Pittsburg, Pa.
398,458. Alternate Current Electric Motor. Oliver B. Shallenberger, Rochester, Assignor to the Westinghouse Electric Co., Pittsburg, Pa.
398,475. Ore-Concentrator. Milton T. Van Derveer, Amsterdam, N. Y.
398,482. Gas-Furnace for Steam Boilers. George Whysall, Toledo, Ohio, and John A. Lambing, Wilkinsburg, Pa.
398,512. Rotary Engine. Lewis C. Huson, Elmira, Assignor to Romeyn B. Ayres, Hammondsport, N. Y., and John H. Hosie, Scranton, Pa., and the Huson Motor Company (Limited).
398,554. Governor for Engines. Henry Tate, Jr., and John Killip, Jr., Liverpool County of Lancaster, England.
398,556. Lubricator for Journals of Railway Wheel Axles. Emery Van Decar, East Albany, Assignor of one half to Aaron Fryer, Bath-on-the-Hudson, N. Y.
398,598. Automatic Device for Dumping Coal-Cars. C. S. Farrer, Dunmore, Pa.
398,619. Preserving and Hardening Wood. Warren Iddings, Warren, Ohio.
398,628. Friction-Clutch. Frederick H. Laforge, Waterbury, Conn., and Hugh J. Barker, Philadelphia, Pa.
398,634. Machine for Rubbing or Dressing Stone. David Mackie, Philadelphia, Pa.
398,637. Rock-Drill. James McCulloch, Manchester, Eng.
398,638. Ball for Tube-Welding Mandrels. William S. McManus, Chester, Pa.
398,649. Well-Boring Machine. Gustavus Pech, Storm Lake, Iowa.
398,655. Machine for Locking Sheet-Metal Joints. Longley L. Sangendorph, Cincinnati, Ohio, Assignor of one half to Harlan P. Lloyd, same place.
398,673. Machine for Flanging Sheet-Metal Cylinders. W. Thou, Indianapolis, Ind.
398,686. Device Operating Steam-Engine Indicators. R. M. Beck, Chambersburg, Pa.
398,707. Gas-Meter. John W. Culmer, New Brighton, Pa., Assignor to John H. Logan, same place.
398,708. Plural Piston Gas-Meter. John W. Culmer, New Brighton, Pa., Assignor to John H. Logan same place.
398,721. Gas-Meter. Joseph J. Harrell, New Brighton, Pa., Assignor to John H. Logan, trustee, same place.
398,737. Mercury Holder for Battery Zincs. William P. Kookogey, Brooklyn, N. Y., Assignor to the Kookocey Electric Company.
398,742. Appliance for Breaking Loose or Splitting all kinds of Minerals. Enoch Mould, White Barn, near Newcastle, County of Stafford, Eng.
398,744. Magnetic Regulator. Samuel E. Nutting, Chicago, Ill., Assignor to the Nutting Electric Manufacturing Company, same place.
398,749. Boiler Tube Cleaner. Harvey D. Rice, Brooklyn, and Ernst Volkmann, New York, Assignors to the Abendroth & Root Manufacturing Company, of New York, N. Y.
398,751. Valve Motion for Corliss Steam Engines. G. Rothenbucher, New York, N.Y.
398,756. Packing for Piston-Rods. Fred. F. Swain, Chicago, Ill.
398,771. Guide for Rolling-Mills. Patrick L. Day, Cleveland, Ohio, Assignor to the American Wire Company of Ohio.
398,777. Steam-Engine Valve. Percy R. Foster, Brooklyn, N. Y., Assignor to Marshall T. Davidson, same place.
398,784. Hydraulic Jack. Frank I. Joyce, Dayton, Ohio.
398,785. Hoisting Apparatus. Hugh Kennedy, San Francisco, Cal., Assignor to Leon C. Marshutz and Thomas G. Cantrell, same place.
398,786. Ditching and Grading Machine. David D. Kuhlman, Kansas City, Mo.
398,788. Dust-Collector. John G. Mundy, Jackson, Mich., Assignor to the Knickerbocker Company, same place.

RE-ISSUES.

10,088. Process of Purifying Iron. George G. Mullins, Los Angeles, Cal., Assignor to the Mullins Silicated Iron and Steel Company, East St. Louis, Ill.

PERSONAL.

Mr. Seth Cook, a well-known mine operator, died suddenly at San Francisco, Cal., on the 26th ult.

Mr. R. B. Wallace, Superintendent of the Empire Mining Company, Marysville, Montana, has resigned.

Mr. Thomas G. Merritt, one of the best known railroad men in the South, died at New Orleans on the 24th ult.

The New Bedford Water-Works Association, New Bedford, Mass., will hold its regular quarterly meeting at Boston, March 13th.

Mr. Wm. H. Stevens, of Detroit, managing director of the Iron Silver Mining Company, of Leadville, Colo., has gone to Southern California.

Mr. E. N. Englehardt, Superintendent of the Pueblo Smelting and Refining Works, at Pueblo, Colo., has resigned and will go to Anaconda, Mont.

Mr. Jerome B. Wheeler, President of the Aspen Mining and Smelting Company, and of the Grand River Coal and Coke Company, returned to New York this week.

Mr. Frank S. Craven, Mining Engineer, has returned from China and is at present at King's Mountain, N. C. His permanent address is Morristown, N. J.

Captain John W. Plummer, until recently Manager of the Granite Mountain Mining Company, of Montana, has gone to Wardner, Idaho, to take charge of some gold mines there.

The Russian newspapers record the death of a distinguished officer, Major General Kalakutski, who was well known among technical men as a specialist on iron and steel in connection with artillery.

Electricians in this country and Europe are invited by a committee recently appointed in London to contribute to a fund with which to erect a statue to the memory of Ohm, in Munich, the scene of much of his electrical labors. The 16th of next March will be the hundredth anniversary of his birth.

Mr. E. B. Kirby, of the Philadelphia Smelting and Refining Company, of Pueblo, Colo, has not resigned, as mentioned in our last issue, but has been promoted to be Assistant General Manager of the works, and Mr. Herman Keller, late of the Holden Smelting Works, Denver, has been appointed Superintendent.

General Master Workman Powderly, of the Knights of Labor, has issued another special call, the second in a year, for per capita contributions from the members of the order. Mr. Powderly asks that each assembly shall collect five cents per month from each member, and that the amount be forwarded to the general secretary. He says that the funds will be used to advance the general welfare of the order.

Mr. Benjamin Harrison, who has been manager of the Leadville Consolidated Mining Company at Leadville, Colo., for several years past, has gone to Silver City, New Mexico, to assume the management of the Pacific Mining and Milling Company. Mr. S. W. Mudd, manager of the Small Hopes Consolidated Mining Company, of Leadville, Colo., succeeds Mr. Harrison in the management of the Leadville Consolidated.

The New York Minerological Society is desirous to obtain by purchase the geological collection to which Mr. Benjamin R. Chamberlin has devoted so much time and trouble. The specimens were all gathered upon Manhattan Island and tell an interesting story of its antediluvian history. An appeal is made to the liberality of New York's citizens in order that the unique collection may be kept intact. Contributions should be sent to the secretary, George F. Kunz, No. 402 Garden street, Hoboken, N. J.

AMERICAN GOODS WANTED ABROAD.

We invite manufacturers to send us catalogues, price-lists, with export discounts, and we will forward the same to our correspondents free of charge.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them, without charge, information concerning American manufactures of every kind.

These services are rendered gratuitously, solely in the interest of our subscribers and advertisers; the proprietors of the ENGINEERING AND MINING JOURNAL are not brokers, or exporters, nor have they any pecuniary interest in buying or selling goods of any kind. Under this head we shall publish each month a list of inquiries received at this office from foreign subscribers of the ENGINEERING AND MINING JOURNAL for various articles of American manufacture. During the past month, inquiries have been received as follows:

FROM MEXICO.—Cob-cutter, cutting small, but not grinding; machinery for grinding corn; feed-cutters.

FROM AUSTRALIA.—Cheap stoves and ranges. Rubber boots and shoes; hay rakes, not tied to any colonial agent; shovels for mining and coal work, axe and hammer handles, scales, cartridges.

A well known Australian house wishes to take the agency for a lager beer, which must be light and sparkling; 1000 barrels a month will be wanted. One dozen bottles must contain two gallons full measure; bottles to be of good glass. Commission, two and one half per cent on sales.

INDUSTRIAL NOTES.

Gas companies at Portland, Ind., offer manufacturers who will locate there free gas for fuel and light.

The Tubular Wheel Company has decided to commence work at once at its proposed works at Bissell, Pa.

The last of the large castings for the hull of the United States cruiser "San Francisco" was made at San Francisco, Cal., on the 24th ult. It is the port strut and weighs 16,000 pounds.

The Westinghouse Airbrake Company, of Pittsburg, Pa., placed with Messrs. Manning, Maxwell & Moore, of New York, an order for 214 21-inch lathes for the new shops now being built.

The Black Diamond File Works of G. & H. Barnett, at Philadelphia, Pa., were destroyed by fire on the 27th ult. The loss will exceed $70,000. Twenty-three steam hammers of recent manufacture were destroyed.

According to the Pittsburg *Times* Mr. Jacob Reese has made arrangements with the Pennsylvania Steel Company to cast a steel gun by a new process. He says it is to be manufactured of fine steel poured around a rolled and hammered core.

The New England Julien Electric Company has been formed, with a capital stock of $1,000,000. It controls the right to the system for electric traction, etc., by arrangement with the Julien Electric Company and Julien Electric Traction Company of New York.

MACHINERY FOR RUSSIA.—The British steamship "Montauk" is now at Brooklyn, N.Y., where she is taking on an immense quantity of reaping and harvesting machines, cultivators, and other agricultural implements for Russia. Her cargo will be discharged at Odessa.

The Decatur Iron Bridge and Construction Company Works have been sold at Decatur, Ala., and bought in for the First National Bank for $23,000. If the court confirms the sale, which is doubtful, the works will be operated at Decatur. They cost three times that amount.

Mr. Rudolph Ericsson, of New Britain, Conn., the inventor of the new explosive, "extralite," which has proved by recent experiment that while its destructive force is terrific, it is perfectly safe to handle or transport, and cannot be exploded by fire or in the open air, but only by percussion in a cartridge, has taken out letters patent, and a stock company will be organized to manufacture the explosive in New-Britain.

A number of white lead manufacturers of the United States held a meeting at Pittsburg, Pa., on the 26th ult. A schedule of prices, providing for an advance on present rates, was discussed at length, but no definite action was taken. Among those who were present were R. P. Rowe, of New York; C. Pemberton, Philadelphia; F. W. Rockwell, St. Louis; George O. Carpenter, St. Louis, and F. Eckstein, Cincinnati.

The Stilwell and Bierce Manufacturing Company, of Dayton, O., have just engaged in the manufacture and sale of mining machinery and appliances, and for this purpose have associated with them Mr. W. H. H. Bowers, a mining engineer and metallurgist, well known for his practical skill and ability. The company will make leading specialties of his patented inventions, of which it has the sole right to manufacture and sell.

The Harrisburg Iron Company, which recently leased the Lochiel plant at Harrisburg, Pa., began operations last week. Previous to the resumption of work the 300 or more employés who have been idle since last Thanksgiving Day, when the failure of Cooper, Reynolds & Co., the former lessees, was announced, were given to understand that they would have to accept a reduction in wages of 50 cents per ton. The men refused to accept the reduction and but 36 went to work.

The announced reduction in wages of the employés of the Reading Iron Works, of Reading, Pa., and the Brooke Iron Company at Birdsboro, Pa., went into effect on the 25th ult. Similar reductions, to take effect at a later date, have been announced in a number of other iron mills throughout the Schuylkill Valley. The puddlers at the Reading Iron Works will hereafter receive $3.25 per ton, and those of the Brooke Iron Company $3, a reduction at each place of 25 cents per ton.

CONTRACTING NOTES.

Our list of machinery and supplies wanted will be found on page xvi. Manufacturers of machinery, engineers and contractors should also consult our directory of "Contracts Open" on page xvi. This week, proposals are invited for the following new contracts: No. 1306, Dredging; No. 1307, Excavating; No. 1308, Dredging; No. 1309, Construction of Dikes and Mattresses; No. 1310, Dredging; No. 1311, Construction and Repair of Dams and Shore Protection; No. 1312, Construction of Pile Dike; No. 1313, Building Water-Works; No. 1314, Dredging; No. 1315, Furnishing Cast Iron Water Pipe; No. 1316, Furnishing Cast Iron Water Pipe; No. 1317, Erection of Bridge; No. 1318, Construction of Sea Wall; No. 1318, Furnishing Water Supply System; No. 1320, Constructing Wrought Iron Swing Bridge; No. 1321, Building Iron Steam Tender.

The Thomson-Houston Electric Company has just been awarded a contract for the equipment of the electric railway from Rochester, N. Y., to Charlotte. The contract is to be completed by the 1st of June. There will be sixteen cars. Each will be equipped with two 15 horse power Thomson-Houston motors, and will be lighted with five electric lamps. The power station will be located near the Central Railroad crossing, and will be equipped with two 100 horse-power engines and two 80 horse-power Thomson-Houston generators.

GENERAL MINING NEWS.

ALABAMA.

BIBB COUNTY.

BRIERFIELD COAL AND IRON COMPANY.—This company has ordered a suspension of its works, furnace, coke-ovens, and coal mines. The property will be sold by order of the court.

JEFFERSON COUNTY.

MARY LEE COAL AND RAILWAY COMPANY.—This company will issue bonds for $125,000, and will build a railway connecting its mines with all the railroads entering Birmingham, besides increasing its openings and make the output 1000 tons per day. Coke ovens will be built.

[From our Special Correspondent.]

ALEXANDER CITY, Feb. 25.

The great boom in gold mining has again seduced me from the modest Ten Acres to this mining center, and also to take another look among the prospects.

CLAY COUNTY.

In this county the Idaho is organizing a company to work on a scale commensurate with the size of the mine. The $1.20 ore at the surface in the fifty feet wide vein, at a depth of seventy-five feet, had increased to $4, and is still free milling. The ten-foot vein milled $2, but showed assays as high as $38.

The facilities for mining are so good and labor and fuel so cheap that the Idaho it is thought will prove a veritable bonanza. There is at least 175,000 cubic yards of placer that will run from $1 to $3.50 per cubic yard.

The water, in great abundance, is within half a mile, and the dump is all that could be asked for, so that the company will have a couple of years of good placer mining in addition to the mill work.

The ore is very friable and I understand they will put in Huntington mills.

TALLAPOOSA COUNTY.

This county is working up something of a boom also, and the Alexander City Gold Mining Company has been organized with a capital of $1,000,000 in 100,000 shares of $10 each, and will commence at once to erect a plant to reduce 200 tons of ore daily. The mill, with all the appointments and appliances for saving gold, will be of the very best that can be had. The mines are near Alexander City and are extensive.

The ore is free milling, and in quality ranges between low and high grade. Numerous assays show an average value of $10.22 per ton.

The facilities here are also good and the ore can be mined and milled for less than one dollar per ton. The mill will be within three miles of railroad. Johnston Beggs, of St. Louis, is president of the company.

ARIZONA.

GILA COUNTY.

There were shipped from Tucson to Baltimore, Md., during January 258,240 tons of copper bull on, which came from mines around Globe.

YAVAPAI COUNTY.

UNITED VERDE COPPER COMPANY.—At the annual meeting, held last week in New York city, the following trustees were elected: Jas. A. Macdonald, President; John L. Thompson, Vice-President; W. L. Bretherton, Secretary and Treasurer; Geo. J. Worts, H. G. Atwater, Geo. G. Trask and Alfred W. Montgomery. About 300,000 shares were represented at the meeting. Secretary Bretherton informs the ENGINEERING AND MINING JOURNAL, that on account of the heavy snow-fall little work can be done at the mine at present, but in the spring every effort will be made to push work as fast as possible. The property is leased nominally to W. A. Clark, but he is by far the largest stockholder in the company.

CALIFORNIA.

AMADOR COUNTY.

AMADOR GOLD MINE.—Mr. H. R. Lounsbery informs the ENGINEERING AND MINING JOURNAL that shaft No. 3 on this property is now down 450 feet and that the mill will be completed April 1st.

PLYMOUTH CONSOLIDATED MINING COMPANY.—The stock of this company has been very active and firm in New York this week, based upon the following encouraging communications from the superintendent which were forwarded to the ENGINEERING AND MINING JOURNAL by Mr. H. W. Lazelle, the Secretary of the company. The first, dated Plymouth, February 11th, says: "Started twenty stamps to-day. Will drop more as soon as possible." The second, dated February 16th, reads: "We think we shall have forty stamps running before March 1st. Shall increase them just as fast as we can get the rock to keep them going." And the last, dated February 23d, announces: "Twenty-five stamps running. More will be started fast as possible."

EL DORADO COUNTY.

INEZ GOLD MINING COMPANY.—A special meeting of the stockholders was advertised to be held at the New York office of the company this week for the purpose of devising a plan to pay the company's debt. Secretary J. E. Coleman informs the ENGINEERING AND MINING JOURNAL that the meeting was adjourned subject to the call of the President, and that the matter will probably be dropped for the present. Mr.

Coleman further states that the indebtedness is entirely secured by bonds. Particulars concerning the condition of this company were given in the ENGINEERING AND MINING JOURNAL of January 12th.

NEVADA COUNTY.

Works are to be established in Grass Valley for treating ores by the Newberry-Vautin process.

LITTLE PITTSBURG.—The new mill has started up. This mill is of ten stamps, and the accessory machinery comprises the latest approved gold-saving apparatus. Several hundred tons of ore are on the dump in readiness for reduction.

NORTH STAR MINING COMPANY.—Work on the new hoisting plant for this mine has begun. When the works are completed, the company will be thoroughly equipped for sinking the shaft to a depth of 3500 feet, double the depth attained to date.

SAN BERNARDINO COUNTY.

SAN JACINTO SYNDICATE, LIMITED.—Mr. E. N. Robinson, General Superintendent of this company, reports that an English company has purchased the property and reorganized in London, under the name of San Jacinto Syndicate, Limited. The capital stock is $1,500,000. The syndicate bought all the property known as Rancho Sobriento de San Jacinto, near Riverside. Under the management of the new company, the tin mines on the ranch will be thoroughly developed.

SAN DIEGO COUNTY.

The completion of the great flume which has been so long building was celebrated at San Diego, on the 22d ult. The flume extends from the western slope of Cuyamaco mountain, where the reservoir is at an elevation of 4500 feet. Length of flume is about 50 miles. The cost was $900,000. There are 350 trestle bridges and eight tunnels along the line and 9,000,000 feet of lumber was used in its construction. The amount of water on hand is said to be 2,600,000,000 gallons.

A New York company proposes to establish works near San Diego for making potash from kelp.

COLORADO.

Dr. George C. Munson, Superintendent of the United States Branch Mint in Denver, has, at the instance of Dr. Kimball, Director of the mint, collected statistics of the value of the mineral yield of Colorado. His report gives the total value of the mineral yield of Colorado, exclusive of iron, coal, oil and kindred products, at $36,550,000.

The principal increase is in silver and is largely credited to the Aspen and San Juan mines, the former exceeding the production of the previous year by eight to nine millions of dollars according to the mint report, and threatening to come very near crowding the figures of the Leadville district.

The Colorado mines also show a marked increase in their production of lead and copper, but the probable continued increase in the yield of these metals cannot be estimated with equal certainty, as everything depends upon the price of the metals.

The Denver Fuel Company has been absorbed by the Colorado Fuel Company, and the latter will hereafter operate the mines of the Denver Company. The Colorado Fuel Company is now one of the most extensive in the West, owning mines in Boulder, Fremont, Las Animas and Gunnison counties, and a number of coking plants.

There is considerable excitement at present over copper discoveries just east of Yominy Park, 25 miles above Derby Park. Prof. James Diits, Superintendent of Schools for Eagle County, has just visited the place, and states that the entire section is staked off in claims. Large quantities of the metal have already been taken out and hauled in wagons to Dillon, the nearest railroad station. When the new wagon-road has been completed from the Grand River to Russell's, the ore will be loaded upon Rio Grande cars at the latter point.

NEW ENGLAND GOLD AND SILVER MINING COMPANY.—The annual election of officers of this company was held in New York recently. Mr. L. R. Hoyt of Danbury, Conn., was elected presedent, B. B. Cowperthwait, of New York City, vice-president, and F. Nichols, of Brooklyn, N. Y. secretary and treasurer. Mr. Cowperthwait is the big furniture man of the metropolis. When seen by an ENGINEERING AND MINING JOURNAL reporter, he pleaded that he was "a little mixed" concerning the company's affairs. He thought the proberty was being worked by a lessee but he wasn't sure about the amount of capital stock of the company. Anyway, Mr. Hoyt of Connecticut could give full information.

CLEAR CREEK COUNTY.

BAKER MINING COMPANY.—A reorganization of this company has been effected.

CONEJOS COUNTY.

A gas well is reported to have been struck 25 miles north of Alamosa. The parties who put down the well were boring for water. At the time the well was struck machinery for boring for gas was in transit from Chicago.

DOLORES COUNTY.

RICO CONCENTRATION AND SMELTING WORKS.—Operations have begun. A trial run will first be made on 70 tons of ore which has been purchased for that purpose.

LAKE COUNTY.

ADAMS MINING COMPANY.—It is reported that this company has passed the payment of the coupons on its hands. The property contains a great deal of ore, but it is all very low grade.

BOREEL MINING COMPANY.—The stockholders of this company have elected the following trustees for the ensuing year. H. B. Denman, R. C. McCormick, R. C. Kerns, T. Moore, Jr., and C. A. Cameron. Mr. Denman is president, Mr. McCormick, vice-president, Mr. Cameron, secretary and treasurer. At the annual meeting held recently in New York, the treasurer presented a report showing that after an idleness of two years the company's property was finally leased last December. During the month of January, the lessees took out ore to the value of $434.07, of which the company receives thirty per cent, or $130.22.

LEADVILLE CONSOLIDATED MINING COMPANY.—This company has filed a declaration with the Secretary of State appointing S. W. Mudd the authorized agent in Colorado.

LITTLE PITTSBURG MINING COMPANY.—According to reports, leading stockholders will take measures to secure the property to those who are now interested in it, and will contribute their proportion towards liquidating existing obligations. The time for the redemption of this company's property, now held by its judgment creditors, the Little Chief Mining Company, which was to have expired on February 25th, has been extended to May 25th. Mr. H. A. Kirkham, of the Little Pittsburg Company, stated to an ENGINEERING AND MINING JOURNAL reporter, to-day, that it would undoubtedly be redeemed.

SMALL HOPES CONSOLIDATED MINING COMPANY.—We are indebted to Mr. C. A. Cameron, the secretary of this company, for the following figures: Cash balance February 1st, $17,541. In addition to this balance, the company has a reserve fund now amounting to $54,000.

PUEBLO COUNTY.

PHILADELPHIA SMELTING COMPANY.—The capital has been increased from $500,000 to $1,250,000, and plans are now being prepared to enlarge the works to 12 blast furnaces, 36 × 120 inches each, and to increase the number of roasting furnaces to 18. The company also contemplates the erection of a complete refining plant, with capacity to desilverize all of its base bullion. At the present time the company has 12,000 tons of ore stacked in its yards.

SUMMIT COUNTY.

VICTORIA GOLD MINING COMPANY.—The ENGINEERING AND MINING JOURNAL is furnished with a copy of the following letter which, we are informed, has been received in New York. It is dated Victoria, Colo., February 20th, and says: "Delayed by storm; preliminary examination highly satisfactory; water troubles were serious; monopolized working force; hindered developments; chute solid gold nuggets struck to-day. Goldflake; extent undetermined; mill started regularly Friday; running steadily; not yet on vein stopes; pumps a success." It is signed by a stockholder, Mr. Oviatt, who recently left New York to examine the property. Another letter, dated February 23d, and signed "M. C. Hillyer," says: "Weather cold and stormy; snow three feet deep; made preliminary examination of nearly all the opened mines; greatly pleased with general outlook; confident Victoria is a great and permanent success; only cause of delay was water question, now about settled; mill well planned, and should soon begin regular production; ore bins, chute and drifts full of ore. Goldflake nugget chute just opened produced yesterday about ten pounds of gold; looks fine; largest single piece weighs nearly three pounds."

[From our Special Correspondent.]

If the improvements for mining and milling which are contemplated for this year are made, our county should be very prosperous.

The Burleigh tunnel is showing a larger body of ore than for some time past, the most of which is above the average grade for this mine.

The Colorado Central, Seven-Thirty, Stevens, Jo Reynolds and many other mines are in good condition.

BURRELL GOLD MINING COMPANY.—This company is working its new purchase on Leavenworth Mountain with promising results.

DUNDERBERG MINING COMPANY.—This company has been reorganized and expects to begin work on its property soon. This mine has been a large producer in the past.

DAKOTA.

HARNEY PEAK TIN MINING AND MANUFACTURING COMPANY.—From a telegram dated London, February 16, and recently published, we learn that Mr. Samuel Untemeyer, of New York, is in London. He says that contracts were signed there on the 15th February which secure over $2,000,000 of British capital to work the Harney Peak tin mines, in Dakota. Professor Vincent sails in March to take charge of the work. The company has come down from its ten million basis. We hope some work will now be done at the mines to demonstrate the existence of tin in paying quantities.

LAWRENCE COUNTY.

CALEDONIA MINING COMPANY.—Superintendent T. L. Skinner reports to the New York office that he is extracting and milling on an average about 240 tons of ore per day. About 90 men are on the pay roll. During the week ending February 18th, the output was 1665 tons, making a total production for the first three weeks of February of 4986 tons.

DEADWOOD REDUCTION WORKS.—The company has declared a stock dividend upon all paid up stock of the company of 40 per cent, which makes the stock now issued up to the maximum fixed by charter, $100,000. The property of the company has cost that amount. The new works at Deadwood are reported to be working smoothly and satisfactorily. A clean-up will be made about March 1st.

FLORENCE COAL, LAND AND OIL COMPANY.—This has been organized by R. C. Lake, of Rapid; Bartlett Richards, C. C. Hughes and Randall Flanders, of Chadron, and J. M. Elliott, of Whitewood. The principal place of business will be at Rapid City, with branch office at Chadron. Location of works, Lawrence County, near the Bare Butte, being the coal locations of John M. Elliott. The capital stock will be $1,000,000; shares, $10 each. Money for the development of the property will be furnished by the three first named incorporators, who will vigorously push prospecting work. It is the design to purchase a 1200-foot diamond drill, which will be put to work at once. Mr. Elliott has prosecuted work for the past year upon the grounds, and at depths of 18 feet encountered a 20-inch vein of good coal, with sand rock underlying. Many tests have been made of coal from the 20-inch vein by blacksmiths and others at Whitewood, it is said, all with good results.

IDAHO.

ALTURAS COUNTY.

QUEEN OF THE HILLS MINING COMPANY.—This company is enlarging the old shaft into a double compartment affair, and new hoisting machinery is being put in. The company will develop the mine 200 feet lower than its present depth.

MARYLAND.

GARRETT COUNTY.

SPRING GARDEN COAL AND COKE COMPANY.—This company is preparing to commence mining coal near Elkins. The hoisting engine and pump are in position.

MINNESOTA.

IRON LAND COMPANY.—This company has been organized in London with a capital of £1,000,000. The company has purchased 2000 acres of the Vermilion Range. Mr. Charles E. Parent, the vender, it is stated, has received $1,000,000 in cash and $1,350,000 in shares.

MONTANA.

DEER LODGE COUNTY.

BI-METALLIC MINING COMPANY.—The first shipment of bullion, consisting of 18 bars of about 100 pounds each, was made on the 22d ult. The mill has been running so far on second-class ore. This ore had accummulated because it was not profitable for shipping purposes when richer ore was to be had, and it was run through the new mill first.

PEARL MINING COMPANY.—Operations have been temporarily suspended. The pumps have been drawn and all work discontinued for the present.

WEST GRANITE MINING COMPANY.—It is said that President Holter and Treasurer Parchen have failed in their attempt to raise $100,000 in St. Louis for the purpose of paying off the present indebtedness of $40,000, and the balance to be used in developing the mine.

JEFFERSON COUNTY.

HELENA MINING AND REDUCTION COMPANY.—In accordance with the plan published in the ENGINEERING AND MINING JOURNAL of February 9th and 16th, a meeting of the stockholders of this company was held in Helena, February 20th, to consider the proposition of leasing all the company's property to the Helena, Livingston, Smelting and Refining Company at East Helena for two years. The lease was made without limitation of period. This amounts to a sale of the properties to the new company, as the stockholders of the one company comprise the majority of those of the other. The Helena *Herald* says this will result in the closing down of the smelter at Wickes, to be only as an overflow works auxiliary to the one at East Helena. The mining claims leased are the Alta California lode, Faith lode, Custer lode, North Pacific lode, Somewhere lode, Alta Brooke lode, Grand Father lode, together with the mill sites for each claim. Also the chloridizing and amalgamating works, concentrating works, smelting works, and all the tools, ore, supplies, together with all rights, franchises and privileges. The Comet mine, Comet town-site and tramway, water rights, etc., Fayette, Alpha and Kate lodes in Colorado mining district are included in the transfer. All of this property is in Jefferson county, and includes every piece of property owned by the Helena and Remini company.

LEWIS & CLARKE COUNTY.

EMPIRE MINING COMPANY.—The Empire mine has closed down for an indefinite period. One of the causes of the shut-down is said to be a lack of water to run the vanners. It is stated that the ore is exceedingly low-grade, not running above $4, and it cannot be worked profitably without the aid of the vanners. The only water supply is from springs, and as there has been no water fall since last July, the supply is short. There is a 60-stamp mill on the property, and six thousand feet of tunnels and levels have been run. The majority of the stock is owned in England, and the company has not put up the money it agreed to for the development of the mine. As long, however, as it was possible to run the vanners, there was enough taken out to pay expenses and leave a small margin. Mr. R. B. Wallace, the superintendent, has resigned.

SILVER BOW COUNTY.

LEXINGTON MINING COMPANY.—It is learned, says the Butte *Miner*, on good authority that the old bonanza vein of the Lexington has been recovered. This was accomplished some time ago but has been jealously guarded from public knowledge until the circumstance reached the ears of a reporter yesterday. It had been suspected that something out of the common was going on at the mine, from the fact that additions to the working force have taken place at intervals during the last few months. The old vein was lost on the 300 level, and as Superintendent Wartenweiler was opposed to doing dead work no effort was made by Foreman Kellogg in the line of systematic search. Since his departure Mr. Kellogg has been free to exercise his judgment in the matter, and the result of his ex-

ploration on the 300 level is, it is reported, that the vein was recovered fifty feet south of where it was lost. It is asserted that it shows up three to nine feet wide, and they expect to catch it below. The ore is high grade, and runs from 80 to 180 ounces in silver. It is said in proof of the above that for the last three weeks the mill has quit working on custom ore, and has been working on the new find.

NEVADA.

ELKO COUNTY.

The new mill at Tuscarora, to which we referred in our last issue, has been carefully tested and found to work satisfactorily, and has been accepted by the Commonwealth, Nevada Queen and North Belle Isle mining companies, which contracted for its construction. It will be several weeks before it is in regular operation, as it will be necessary to build an assay office, make connection with the water main, and arrange other preliminaries. As it is a double mill it will probably be started on ore from two mines, but which two has not yet been decided upon. In all probability it will first be run upon Nevada Queen and North Belle Isle ore, as the commonwealth people wish to get their 350-foot level thoroughly opened before they start in to produce bullion.

EUREKA COUNTY.

EUREKA CONSOLIDATED MINING CO.—The company reports having been overdrawn at the bank at San Francisco to the extent of $4528 88, but has available assets, consisting largely of bullion and coke at the mine, amounting to $19,513.64.

STOREY COUNTY—COMSTOCK LODE.

We condense the following from the Virginia City *Chronicle*: The ore yield of the Comstock during the week ended the 16th inst. was 5088 tons, divided as follows: Consolidated California & Virginia, 2518, assay value, $33.20: Chollar, 800, assay value, $21.50; Hale & Norcross, 978, assay value, $20.26; Savage, 422, assay value, $20.65; Confidence and Challenge, 300, assay value, $28.19; Alta, 220, assay value, $27.50; Justice, 250, assay value, $31.25; Overman, 300, assay value, $14.50. The bullion proceeds from this ore was about $130,000.

CHALLENGE MINING COMPANY.—During January the gross product of this mine was $15,781.34 from 840 tons of ore worked at the Brunswick mill. After paying all expenses the company is now overdrawn at the bank about $1,000.

CHOLLAR MINING COMPANY.—The total production of bullion during January was $48,000.

PHIL SHERIDAN MINING COMPANY.—The trial of John W. Pearson, on a charge of converting to his own use $60,000 of the funds of his company, has been on trial in San Francisco. The books of the company were brought into court, and counsel for the State claims that erasures are plainly visible where the accounts have been altered to cover up Pearson's alleged defalcations.

SAVAGE MINING COMPANY.—The gross bullion yield of the mine in January was $24,848.

NEW MEXICO.

GRANT COUNTY.

Mr. W. G. Waring, superintendent of the Flagler Reduction Works, has been successful in interesting capital in the erection of a new smelter and sampling works. The location of the works has not definitely been decided, but will either be at Silver City or at Deming.

OHIO.

The Standard Oil Company has bought out Joshua Rhodes, J. J. Vandergrift and others in the Lima oil field. These are the last independent operators in the Lima region. This deal gives the Standard control of 40,000 acres in that field. The trade was consummated in Pittsburg last week and the price agreed upon, it is said, was $173 000. The company has acquired, or is fast acquiring the controlling interest in the Chicago Gas Trust, and it is said, intends to use the Lima oil which it pipes to Chicago for the purpose of making gas, having obtained control of a valuable new process of making gas from oil.

ATHENS COUNTY.

FEDERAL VALLEY COAL COMPANY.—This company has erected a plant of 20 coke ovens to coke its slack. The company owns 5,000 acres of coal.

PENNSYLVANIA.

COAL.

CLEARFIELD CONSOLIDATED COAL COMPANY.—This company is in serious trouble and a receiver has been appointed. A week ago President Samuel P. Langdon and his board of directors were deposed, Samuel A. Sague being elected President, with an entirely new board. Mr. Langdon then got out a writ of quo warranto requiring the new officers to show by what right they acted, and also procured a temporary injunction against them. President Sague responded by filing a bill in equity declaring the company insolvent and charging Mr. Langdon with attempting to wreck the company, making false returns of tonnage and illegally transferring stock to himself and others. The company is said to have lost $30 000 last year, but this may be accounted for by the fact that in order to undersell the Berwind White Company it took large contracts at less than the cost price of coal delivered.

LEHIGH COAL AND NAVIGATION COMPANY.—This company has shut down operations at all of its eight or nine large collieries in the Summit (old Lehigh) region.

READING COAL AND IRON COMPANY.—The company stated last week that, until further notice, its collieries now being operated on three-quarters time six days a week will be worked only three-quarters time, but four days a week. These collieries, about 21 in number, when operated to their full capacity, produce about one third of the total output of anthracite made by the company in all its 46 collieries. All of the other collieries of that company in the Schuylkill district have been idle since the 1st instant.

NATURAL GAS.

PHILADELPHIA NATURAL GAS COMPANY.—The New York Stock Exchange has listed $1,500,000 first mortgage 6 per cent bonds of this company.

TENNESSEE.

CHATTANOOGA LAND, COAL, IRON & RAILWAY COMPANY.—This company, which owns 25,000 acres of land on the north and west side of the river, opposite Chattanooga, embracing coal deposits on Walden's Ridge, large iron mines and tracts of timber land, has sold a controlling interest to a Boston, New York and Philadelphia syndicate. It is stated that the consideration exceeded $1,000,000. The erection of an iron railway bridge across the Tennessee, the building of a railroad to the top of Walden's Ridge and other extensive improvements will be begun immediately.

FOREIGN MINING NEWS.

CANADA.

BRITISH COLUMBIA.

NEW VANCOUVER COAL MINING AND LAND COMPANY, LIMITED.—This Company has been organized in London with a capital of £180,000, in £1 shares. The object is to acquire and take over as a going concern the undertaking of the Vancouver Coal Mining and Land Company, Limited, incorporated in 1862, and all or any of the assets and liabilities of that company on such terms as may be arranged, and with a view thereto to acquire any shares in the capital and securities of, and claims against such company.

VANCOUVER'S COAL DEPOSITS.—The Interior Department report contains the following report from the Director of the Geological Survey: "Two series of coal seams came to the surface on opposite sides of the city of Vancouver. The coal measures occupy the whole of Stanley Park, and also immediately underlie the city. By means of a bore of more than four hundred feet, put down near the Granville Hotel, in Vancouver, nearly twenty years ago, some lower beds of the series coming to the surface in Stanley Park have been proved to be either non-continuous or barren. But the seams which have given Coal Harbor its name, more probably escaped the investigation of prospectors altogether, from the circumstance that the locality selected appears to have presented only strata overlying the coal. The upper coal croppings of Bremery Creek and other localities on the south side of False Creek do not anywhere extend to the northward of False Creek. They could be conveniently intersected by a bore on the line of the False Creek trail to Frozen River, which could be so located as to reach the coal at any desired depth below the surface.

NOVA SCOTIA—LAKE CATCHA DISTRICT.

OXFORD GOLD MINING COMPANY.—At the annual meeting of the stockholders of this company, held recently in New York, the following officers were elected: Emerson Coleman, President; Edward Tuck, Vice-President, and F. F. Randolph, Secretary and Treasurer. The capital stock of the company is $125,000. There are nominally 125,000 shares, although only 100,000 were issued. The company is organized under the laws of this State. For a number of years it has paid dividends, the last being the twenty-seventh. Mr. Randolph informs that us the company paid twelve per cent in 1888, and twenty-one per cent in 1887. Up to January, 1st, 1885, the company had paid $36,000 in dividends

PROVINCE OF ONTARIO.

CANADIAN COPPER COMPANY.—We learn that the new furnace is now smelting on an average more than 125 tons of ore daily. It is stated that the company has decided to put up a second furnace in the spring, as it has been obliged to close down one half its mining capacity, the other half easily supplying one furnace. The production of both copper and nickel from this property promises to greatly exceed estimates made a year or so ago.

CENTRAL AMERICA.

HONDURAS.

SANTA LUCIA MINING AND MILLING COMPANY.—The stockholders of this company have elected the following trustees to serve for the ensuing year: J. M. Everhart and Samuel McEachen, of Scranton, Pa; Geo. W. Bachman, Durham, Pa.; T. J. Foster, Shenandoah, Pa.; Floyd B. Wilson, George F. Bingham, W. R. Little, M. D., Frank J. Crevling, Jas. N. Nicholas, all of New York, and J. J. Williams, J. G. Kilmer, W. S. Redlick, and J. H. Meare. Mr. Everhardt has been elected president, Mr. John I. Mathias, vice-president; J. J. Williams, secretary, and W. R. Little, treasurer. Edw. J. Phillips is superintendent. This company was organized under the laws of New York State, in February, 1886. Its capital stock is $2,500,000, divided into 100,000 shares. As may be seen from the above list of directors, much of the stock is held in the Pennsylvania coal regions. The company's property is located in the department of Tegucigalpa, near the town of Santa Lucia, and was one of those discussed in the ENGINEERING AND MINING JOURNAL, July 10th, 17th and September 11th, 1886, to which all who are interested in mining in Honduras should refer.

MEXICO.

The Ramereze-Varela Colonization Company has taken up 1,000 sites of land in the States of Guerrero and Oaxaca and will transfer it to an American syndicate. This is a valuable land and mining concession.

The Torreon copper and silver mines, within about twenty-five miles of the city of Chihuahua, have just been taken over by an English company, who intend to develop the property and work it on a larger scale than heretofore. There are two 30-ton water-jacket smelters, by Fraser & Chalmers, on the property, and work will be started immediately with the view of opening up the mines in depth, all work up to the present having been done in shallow pits and open cuts of comparatively limited extent. The General Manager and Consulting Engineer is Mr. J. H. Collins, F.G.S., of London, England, and Mr. Henry F. Collins, A.R.S.M., of London, is the Resident Superintendent.

LOS NUEVOS DES SANTA MARIA GOLD AND SILVER MINING COMPANY.—The mining suit of Mrs. Mary Beadleson against Asbury Harpending and John B. Alley to recover the money invested in this company came up again in Brooklyn, N. Y., on the 23 inst. Recently a discontinuance was filed in the suit and it was understood to be settled as already reported by the ENGINEERING AND MINING JOURNAL. The action was tried in December, 1887, before Judge Cullen and a decision given for the plaintiff. An interlocutory judgment was issued and an accounting ordered. The claim was that the defendants had defrauded the plaintiff and other stockholders by a shrewd mining scheme. Among the stockholders were Frederick Billings and Royal H. Robbins, who were large holders. Now they come into court and claim that the settlement entered into by Mrs. Beadleston was without authority. The motion on the 23d ult., was to set aside the discontinuance. This is combatted by Mrs. Beadleson's counsel, who claim that everything was done with proper authority. Voluminous affidavits are submitted on both sides. The basis of the settlement is said to be $100,000, of which $40,000 went to Mrs. Beadleson and her counsel, she receiving $30,000 and Messrs. Billings and Robbins $30,000 each. Mr. Harpending was seen by an ENGINEERING AND MINING JOURNAL reporter this week, but he declined to give any statement for publication.

MALANOCHE MINING COMPANY.—We received from Mr. Joe M. Kolbeck, of the new Malanoche Mining Company, the following interesting description of the mine under his charge. We trust he will find both the mine and the dump as good as he expects:

With your permission I will notify you of a sale which has taken place in this city within the last two weeks, and which comprises one of the largest and best mines in the Republic of Mexico.

The name of the mine is the Malanoche, and the price paid for the same is almost $1,000,000.

The principal men in the new company reside in New York, and Mr. J. A. Mackinnon, New York City, is president of the new company.

"Malanoche" means the bad night, and the mine was so named from the peculiar manner of its discovery. The mine is located two miles north of the centre of this city (Zacatecas), on the national highway, to Sombrerete. The low-grade ores of the Veta Grande, three miles further north, were all hauled, as at present, to Guadalupe for reduction. The high-grade ores were taken to Guanojuato, which was at the time of the discovery of the Malanoche quite a mining city, having more extensive reduction works than were in this region. At that time supplies had to be hauled from Guanojuato, two hundred miles south of Zacatecas, and about the same north of the city of Mexico.

A train loaded with ores for Guanojuato in December, one hundred and ten years ago, started out of Veta Grande, at 4 o'clock p. m., with the purpose of reaching this city, to remain over night. It was a large train and left in a cold, drizzling rain, which turned to a blinding sleet before the train was two miles this side of Veta Grande. The leader lost his way, and instead of the train continuing directly towards Zacatecas, it sheered to the right until, in dismay, the commander ordered all into camp on the great mountain foot-hill, since called "Malanoche." Camp-fires were built and kept in a glow all night, for a storm of snow and accompanying cold were things rarely met with by thinly-clothed Mexicans. When day came with a brilliant sun, the freighters, in gathering up their fragments of wood after having made their coffee, accidentally brushed ashes off from some quartz rock and discovered silver. The camp fires had been kept up on a wide vein of silver ore, which then was claimed, and it was named the Bad Night mine to commemorate the episode. It proved to be a wonderful mine. Its dumps to day are among the largest in all Mexico. From the time of its discovery up to 1840 no ore under 65 ounces was worked. All under that went to the waste dumps. Later, in the deepest work of the Malanoche, a break occurred in the north wall, estimated as near as the startled miners could guess to be from 4 to 6 feet high. The miners reached the level above crying the alarm, so that in twenty minutes, it is said, all had emptied themselves out of the many shafts and were safe. The break was 800 feet under ground. Inside of 24 hours the mine throughout its very extensive workings was filled with water to a depth of 500 feet. It is calculated that there are 16 miles of shafting, tunneling, drifting and stoping in the Malanoche. It has not since been worked except by several shafts on or near the surface. The dumps have been sorted over in part and it is estimated that the half dozen immense dumps comprise 1,000,000 tons of ore that will average from 25 to 30 ounces to the ton. The property comprises thirty-eight and a half claims, four times the area necessary to make a Gran cuadro "Grand Square" Mine. Many different veins outcrop on the ground. One of the veins was left, at a depth of 800 feet, 40 feet wide, with an average of 90 ounces of silver to the ton.

A phenomenal feature of the Malanoche is its great chambers of ore which are chiefly worked. Once drained of water by powerful machinery this mine will give its millions in dividends. As soon as drained to a depth of 500 feet, 1000 men can be put to work on exposed bodies of 40 to 125-ounce ores. More than three fourths of the veins have never been worked and are of very great importance. The present company are New Yorkers and men of the right calibre, who will put up the necessary machinery during the present dry season, to drain the mine and make it what the famous mine was when worked—one of the largest and most profitable silver producers in the world

ZACATECAS, Mexico, Feb. 20, 1889.

SOUTH AMERICA.

REPUBLIC OF COLOMBIA.

BOCANEME GOLD AND SILVER MINING COMPANY.—We are informed by the officers of the company that Supt. D. T. Hughes writes from Bocaneme, January 26th, that the lower levels of Bocaneme show up beyond his predictions, saying he "has drifted through 100 feet of richest ore yet found in the mine, and followed it for over 200 feet in length."

EL CRISTO GOLD AND SILVER MINING COMPANY.—One of the officers and largest stockholders of this company said to an ENGINEERING AND MINING JOURNAL representative this week. "The superintendent writes, under date of January 27th, that during the week ending on that date 129 tons of ore were hoisted, washed, sorted, and laid on the various piles. The average assay by piles showed the following result: 1st class, 256 ozs. silver; 2nd class, 188 ozs., and blanket concentrates, 317 ozs. The superintendent says that he has received 24 bales of sacks and has started to sack off for shipment. He also sends us a tracing of the present workings. Besides the surface tunnel we have opened out four levels at 74, 124, 200, and 400 ft. respectively. Cross-cutting on the 400 ft. level will be commenced shortly."

ORE MARKETS.

GEORGETOWN.

[From our Special Correspondent.]

For ores running less than 40 per cent lead, 90 to 95 per cent of silver and gold, with price per unit of lead and treatment about as follows:

Per cent lead.	Price per unit.	Treatment.
10·20	20c.	$17.00
20·30	25c.	15.00
30·40	30c.	13.90

This price is independent of lead quotations.

For ores running more than 40 per cent lead, 95 per cent of silver and gold:

Per cent lead.	Price per unit.	Treatment.
40·45	43c.	$11.00
45·50	43c.	10.00
50 and over.	45c.	8.00

Price per unit of lead is based on a quotation of $4.50 per hundred. For each decrease of 5c. per hundred in lead quotation deduct 1c. per unit.

For silicious and other dry ore, 90 to 95 per cent. of assay value less $17 to $20 treatment. The price of treatment is for car lots of 8 tons and over, and includes sampling, charge and freight to Denver or Pueblo. For less than car lots $1 or $2 additional charge for treatment according to size.

LEADVILLE.

[From our Special Correspondent.]

The Leadville ore market can always be described as active, for the smelting capacity is in excess of the production, and while at times there may be a surplus of some particular grade, it is readily absorbed if offered at a shading on ruling rates.

The supply of lead carbonates is at present apparently greater than the demand, though all of it would quickly disappear if it could be obtained at the figures the mines were willing to accept six months ago; that is to say, at 40c. per unit for the lead when 30 per cent and over, on New York quotation, of $4 50 per hundred; 1c. added or deducted for each 5c. change in N. Y. quotation, less $4 per ton working charge. Within the past few months, when a temporary scarcity of lead ores occurred, a few of the smelters were forced to make the price of lead 40c. per unit "flat," *i. e.*, no deduction or addition for variations in N. Y. quotations. As lead has ever since persistently remained far below $4.50, this schedule has been to the advantage of the mines, and they now insist upon its continuance. The smelters, on the other hand, do not yet realize that the production has increased sufficiently to justify insisting upon a return to the former schedules, and, on the contrary, one smelter made a bid lately for a desirable lead carbonate of about 50c. a ton higher than the above, "40@44 on a $4.50 for 30c. and over."

The capabilities of our mines are so great in the way of producing lead zinc sulphides, that, although some of the mines have reduced their output on account of the low price of lead, all that is wanted of those grades can still be secured on the scale given in your issue of January 19th, 1889.

Iron pyrites containing but a small percentage of zinc and silica have advanced slightly, or rather there has been a return to the prices of six months ago. The quantity coming in from the surrounding mining camps was for awhile so considerable as to result in some depression in prices, but now we can quote, at least for the present: 95 per cent of New York quotations for the silver: $18 per oz. for the gold if $\frac{1}{10}$ or over, less $12 to $13.50 per ton working charge; deduct 30c. per unit for each per cent of zinc over 5 per cent; deduct 10c. per unit for each per cent of silica over 5 per cent.

If the ores contain a few per cent of copper, it is paid for at the rate of $1 to $1.50 per unit.

When the snow has disappeared and the roads are in condition to permit the resumption of hauling from the small outlying camps their yield will have a tendency to lower these prices.

There is no increase whatever in the supply of dry oxides, and all that offer are eagerly picked up at 95 per cent of New York quotations for the silver, less $11 to $12 50 working charge.

All of the smelters have made arrangements within the past few weeks for an ample supply of iron fluxing ores, and whatever may now be presented will have to accept lower prices than those named in the ENGINEERING AND MINING JOURNAL of January 19th, 1889.

MEETINGS.

Atlantic Mining Company, No. 76 Wall street, New York City, March 12th, at twelve o'clock, noon. John Stanton, Secretary.

Colorado Coal and Iron Company, Colorado Springs, Colorado, April 1st, at twelve o'clock, noon. H. J. Fitch, Secretary.

Ingersoll Rock Drill Company, No. 10 Park Place, New York City, March 9th, at three o'clock P. M. Special meeting to submit to the stockholders, for their action, an agreement providing for the consolidation of the Ingersoll Rock Drill Company and the Sergeant Drill Company into a new company, to be known as the Ingersoll-Sergeant Rock Drill Company. Wm. L. Saunders, Secretary.

John Duncan Land and Mining Comptny, Germania Hall, Houghton, Mich., March 4th, at two o'clock P. M., D. Kloeckner, Secretary.

Pennsylvania Railroad Company, Musical Fund Hall, Locust street, near Eighth, Philadelphia, Pa., March 12th at eleven o'clock, A M. Tickets of admission can be obtained at office, Room 32, No. 223 South 4th St. Philadelphia. Jas. C. Sims, Jr., Secretary.

Sergeant Rock Drill Company, No. 10 Park Place, N. Y. City, March 9th, at three o'clock P. M. Special meeting to take action as above stated. C. W. White, Secretary.

South Side Mining Company, No. 70 Devonshire St., Boston, Mass., March 27th, at half past three o'clock, P. M. Special meeting for the purpose of taking action upon the renewal of charter of the company, which expires April 11, 1889. Also to elect officers for the ensuing year. C. O. Burbank, Secretary.

Standard Steel Works, 220 South Fourth street, Philadelphia, Pa., March 4th at twelve o'clock, noon.

United States Chemical Co., West Jersey Hotel, Camden, N. J., March 4, 1889, at twelve o'clock, noon. E. R. Jenks, Secretary and Treasurer.

DIVIDENDS.

The following dividends have been declared:

Delaware & Hudson Canal Company, quarterly, one and three-quarter per cent, payable March 15th, at No. 15 Cortlandt street, New York city.

Henderson Bridge Company, of Kentucky, will pay coupons due March 1st, at office of Louisville & Nashville Railroad Company, No. 52 Exchange Place, New York city.

Navajo Mining Company, of Nevada, dividend No. 16, ten cents per share, or $10,000, payable March 1st, in San Francisco.

Rochester and Pittsburg Coal and Iron Company, of Walston, Pa., will pay coupons due March 1st, also twenty first mortgage bonds numbers 1181 to 1200 inclusive on presentation at Gallatin National Bank, No. 36 Wall street, N. Y. City.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of Sale.	Amn't per share.
Anchor, Utah	10	Feb. 1	Mar. 3	Mar. 25	.10
Anna, Dak	3	Feb. 11	Mar. 18	Apr. 10	.002½
Baltimore, Nev	4	Feb. 4	Mar. 8	Mar. 26	.25
Belcher, Nev	37	Feb. 19	Mar. 25	Apr. 12	.50
Best & Belcher, Nev	42	Jan. 10	Feb. 15	Mar. 7	.25
Bullion, Dak	6	Jan. 4	*Mar. 8	*Mar 25	.005
Con. Pacific, Cal	10	Feb. 5	Mar. 11	Apr. 2	.15
December, Utah		Feb. 11	Mar. 25	Apr. 15	.02
Golden Prize, Nev	2	Feb. 16	Mar. 20	Apr. 10	.30
Goodman, Nev	5	Jan. 15	Feb. 16	Mar. 20	.05
Gould & Curry, Nev	61	Jan. 10	Feb. 14	Mar. 7	.25
Gray Eagle, Nev	11	Jan. 23	Feb. 26	Mar. 19	.03
Haywood, Dak		Jan. 21	Feb. 23	Mar. 11	$1.60
Homeward Bound, Dak	6	Jan. 12	Feb. 21	Mar. 9	.002
Iron Hill, Dak	15	Jan. 17	Jan. 17	Mar. 9	.03
Julia, Nev	23	Jan. 30	Mar. 7	Mar. 28	.10
Martin White, Nev	22	Jan. 19	Mar. 6	Mar. 26	.25
May Flower, Cal	44	Jan. 14	Feb. 18	Mar. 11	.50
Monarch, Dak	8	Jan. 15	Feb. 8	Mar. 8	.02
Mount Terry, Dak	1	Jan. 30	Mar. 4	Mar. 20	.001¼
Overman, Nev	59	Jan. 15	Feb. 19	Mar. 12	.25
Peer, Ariz	7	Jan. 28	Mar. 5	Mar. 28	.10
Piedmont, Nev	1	Jan. 28	Mar. 6	Mar. 27	.05
Pilgrim, Mich		Dec. 31	Feb. 1		.50
San Luis, Cal	22	Jan. 30	Mar. 2	Mar. 19	.00144
Savage, Nev	72	Jan. 7	Feb. 11	Mar. 4	.75
Scorpion, Nev	24	Jan. 3	Feb. 8	Mar. 4	.10
Scott Bar, Cal	2	Jan. 23	Feb. 26	Mar. 19	.10
Spanish R., Dak	2	Jan. 30	Mar. 5	Mar. 20	.02
St. Louis, Cal	2	Jan. 14	Feb. 8	Mar. 11	.05
Western, Cal	2	Feb. 21	Mar. 26	Apr. 16	$2.00

* Delinquent day and day of sale postponed to dates given above.

MINING STOCKS.

New York.

Friday Evening, March 1.

The market for mining shares in this city has suffered a relapse to almost its former dullness. The week under review has been a discouraging one. Transactions for the week aggregate 93,633 shares.

Mr. Joseph Aron, ex-president of the Sutro Tunnel Company and now a resident of Paris, has taken the trouble to furnish an evening paper of this city with an arraignment of the present management of that company. In substance, he avers that Mr. Theodore Sutro and the syndicate of bankers who have assisted in the reorganization of the company, to which the ENGINNEERING AND MINING JOURNAL has frequently referred, have appropriated for their own benefit altogether too large a share of the proposed issue of bonds. An issue of $2,200,000 is proposed; of this about 1,500,000 shares goes to the old stockholders, 500,000 to the syndicate which advanced the money to purchase McCalmont Bros.' mortgage, and the proceeds of the remaining 200,000 is intended to defray the expenses of reorganization. This apportionment comes to the ENGINEERING AND MINING JOURNAL from official sources. Mr. Aron's figures, however, are at variance with these, and aided by skillful reporters he has succeeded in giving the affair a sensational tone. Mr. H. H. Thayer, the assistant secretary of the Sutro Tunnel Company, when seen by an ENGINEERING AND MINING JOURNAL representative to-day said that Mr. Aron's assertions were entirely without foundation. Mr. Theodore Sutro, when seen by the reporter, said that the following statement expressed all that he cared to say until his regular report was presented. The statement is stated March 1st and reads in full as follows: "The statements published in an evening paper of February 28th are mainly incorrect. The Mr. Aron referred to is himself a party to the foreclosure, having subscribed on a number of shares with a view of having the property foreclosed; but he would now like to save another large lot of shares on which he has not subscribed, at the expense of other people, and his letters and charges, although addressed personally to me, were not brought to my attention until shown to me by the writers of the said article.

I made every effort to avoid foreclosure, but it was impossible to carry out my plans without having the property pass into other hands and thus be lost to *all* the stockholders; as it is, it will be preserved at least for holders of three-fourths of the stock. My brother, Mr. Adolph Sutro, has had no connection, either directly or indirectly, in any way, with the Sutro Tunnel Company or its affairs for about ten years. Mr. Aron's tirades against him are inspired by malice. I shall not enter into a newspaper controversy about any of these matters; my only duty is towards the Sutro Tunnel Company, and its shareholders, and in due course of time every dollar which has been received and expended since I was first retained to protect the interests of the stockholders in January, 1887, will be accounted for. For the present I refer to the contents of my report of July, 1887, to the records of the company, of the litigation and of the proposed re-organization and to the various public notices to the stockholders informing them of the plan of re-organization, in order to stamp every assertion contained in the statements of Mr. Aron, reflecting in the slightest degree upon myself either as a lawyer or otherwise, as malicious falsehoods.—Signed, Theodore Sutro.

The stock has been neglected at 10c. and the Trust Certificates at 55@57c.

Bullion from $1.45 to $1.60, and Best & Belcher from $5 to $5.50.

There is little doing in Barcelona which was steady at 79@80c.

Navajo has declared another dividend; the stock is neglected, selling at from $1.45@$1.50.

Consolidated California and Virginia advanced from $8 25@$8 85, selling to-day at from $8.75@$8.88. Sierra Nevada was firm at from $3.40@3.55. Gould & Curry at $3 15. Union Consolidated was neglected at from $4@$3.95. Potosi at $2.80. Mexican advanced from $3.65@$4.25. Exchequer from $1.35@$1.45.

There is no change in Rappahannock, which continues unchanged at 9@10c.

There was a downward tendency in Silver King, which went from $1.05@90c., showing transactions of only 1350 shares.

Ontario has now reached $35, and some 303 shares changed hands at from $34@$35. Horn-Silver was firm at from 90@91c.

Mutual was firm at $1.45.

Colchis continues to attract considerable attention, and jumped from $2.25 to $2.50, at which price sales were made to-day.

Little is doing in Iron Silver; one sale was made at $3.50. At the annual meeting to be held next week it is probable that the usual dividend of $100,000 will be declared. Little Chief was only dealt in the beginning of the week at 29@30c.; Little Pittsburg at 8@10c.; Leadville at 13c.; Plutus was active at from $1.00 to $1.05; Chrysolite at 26@27c.; Breece at 22c.; Denver City at 10c.; Cashier at 4@5c.

There was an upward tendency in El Cristo in the beginning of the week, when the price went from $1.50 to $1.80, but later in the week the price declined again to $1.55, ruling to-day at from $1.60@$1 65. The transactions amounted to but 4900 shares.

Kingstone & Pembroke sold at $1.25.

Santiago was firm at $3.50.

Phœnix of Arkansas is selling at 11@12c.

The resumption of operations at the property of the Plymouth Consolidated Gold Mining Company has had a strengthening effect on the market for the stock, and the price has been firm at $10, advancing to-day to $10·50.

Brunswick has been neglected, and declined from 14 to 10c, selling to-day at 12c.

Quicksilver Preferred shows a sale at $37.88 and Common at $7.

Bodie Consolidated shows a small business, declining from $1.60 to $1.55.

Amador sold at $1.65, but later advanced to $1 70. Astoria was firm at 20c. Middle Bar at 31@32c. and Hollywood at 3c.

Homestake declined from $13 to $12. Deadwood Terra shows one sale at $1.48. Caledonia a few at from $2.75 to $2.80. Iron Hill was quoted at 18c. The upward move in Sullivan Consolidated continues. A large business was done, amounting to 21,100 shares at prices which went from $1.40 to $1.60.

Holyoke remains unchanged at 6c.

United Copper has been quite active, and advanced from $1.20 to $1.30.

Boston. Feb. 28.

[From our Special Correspondent.]

There has not been much in the market this week to encourage the bulls on copper stocks, although, except in some of the high-priced mines there has not been much falling off in prices. At same time there is no disposition to load up until something definite is known in regard to the ability of the syndicate to maintain its position. It is thought by some that the matter is virtually settled, and that they are withholding publicity in order to buy a large line of stocks at the present or lower prices. The renewal of the fire at the Calumet & Hecla mine caused a pressure to sell that stock, and resulted in a decline to $260, a loss of $5 for the week.

Boston and Montana is the most active stock on the list, the dealings in it amounting to over 3,000 shares for the week. In the early dealings it advanced from $47.50 to $49, but subsequently lost the advance and declined to $44.25, the lowest quotation for the year, in fact the lowest since July 1888. The closing sale at first board to-day was $45.

Quincy has held fairly steady at $67@$66¾ as extreme prices.

Franklin and Atlantic show but little change, both selling at $14@$14¼.

Osceola has shown more strength and advanced from $14 to $15, closing at the highest price.

Tamarack on small lots advanced from $140 to $147, but later declined to $140, recovering 50c. on to-day's sale of 100 shares at $140½.

Allouez declined to $3¼, a small lot selling at $3.

National was firmer and in good demand at $4¾@$4¾.

Santa Fé holds fairly steady at $1⅞@$2.

Pewabic seems to be sought for at $5; all lots offered taken at that price.

In Silver stocks, Dunkin is the only one dealt in, and maintain a good degree of firmness at 95c.@97½c.

LATER PRICES.

(*Bulletin-Telegraph.*)—March 1 1 o'clock P M.—Calumet & Hecla, off five points more at $255; Tamarack, $140; Boston and Montana, $43¾; Franklin, $13½; Santa Fé, $1⅛; Osceola, $14½; National, 4; Kearsarge, $8; Butte and Boston, $23; Allouez, $3¼ asked; Atlantic, $14 asked.

Pipe Line Certificates.

Watson & Gibson, brokers, 55 Broadway, say that the petroleum market during the current week has been extremely dull and featureless. There is a disposition on the part of the public to speculate in the market, inasmuch as it has persistently refused to respond to what, to them, appeared a remarkably strong statistical condition. The fact that there are only 16,000,000 barrels of Pennsylvania oil on top of ground, and that this is being reduced about 1,000,000 barrels monthly, would lead one logically to come to the conclusion that an important advance must take place in the price of the commodity. The fact, however, has been that during the past year the visible supply has been reduced 10,000,000 barrels, and the price is now 6 or 8 cents a barrel less than at the same time a year ago. In casting about for a reason to explain this curious fact, we are compelled to recognize the disturbing influence of Lima, Ohio, oil, which is now turning out at the rate of over 30,000 barrels per day, at a cost of about 15 cents per barrel. The public doubtless fear that some process will be discovered whereby this oil can be successfully refined, and this acts as a deterring influence on purchasers of Pennsylvania crude. Any attempt, however, to buy oil in the market, on a large scale, would surely result in an important advance in price, and we can, therefore, do no better than to say that the situation is strong, and if any strong party or clique comes in to advance the market, that they can easily do so. We should much prefer to advise the purchase of this commodity on an active and advancing market, even at higher prices, than upon the present dull and dragging market.

NEW YORK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Feb. 23.....	90⅝	91⅜	90¾	91	250,000
25.....	91⅜	92¼	90⅞	92¼	409,000
26.....	92½	93⅛	91⅞	92¼	673,000
27.....	92⅛	92½	91½	91½	454,000
28.....	91	91⅞	90⅝	91¾	515,000
Mar. 1.....	91⅜	92⅜	91¼	92⅜	444,000

Total sales in barrels..... 2,745,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Feb. 23.....	91	91¼	90¾	91	333,000
25.....	91¼	92⅛	90⅞	92	522,000
26.....	92¼	93	91¾	92¼	1,346,000
27.....	92½	92⅛	91½	91⅝	670,000
28.....	91½	91⅝	90¾	91½	1,092,000
Mar. 1.....	91⅛	92½	91¼	92⅜	837,000

Total sales in barrels..... 4,800,000

Auction Sales of Stocks.

On Wednesday, at the Real Estate Exchange and Auction Rooms, A. H. Muller & Son sold 50 shares Daft Electric Light Company, par value $100 each, at $50, and 40 shares Morris & Essex Railroad Company, par value $50 each, at $148¼.

Electric Stocks.

The Edison Electric Light Company wants to put $2,500,000 of its stock on the Stock Exchange.

The bill increasing the capital stock of the Thomson-Houston Electric Company to $10,000,000 common and $5,000,000 preferred stock was signed by Governor Bulkley at Hartford, Conn., on the 28th ult. Counsel for the Edison and Westinghouse Syndicates pursued the bill to the Governor's room and made an ineffectual attempt to induce him to withhold his signature. Counsel for company urged the necessity for increased capital. After listening to arguments for an hour Governor Bulkley signed the bill.

London Stock Market.

The Rothschilds will, it is reported, form a limited liability company to work the ruby mines in Burmah. The company is to be brought out in London by the company of which Messrs. Smith & De Crano are the engineers and active members. We learn from a private letter, dated February 15th, that "the new Ruby Mines Company is to be brought out next week. The mines may be immensely valuable, or perhaps not; no one can tell as to this until a year's work has been done upon them. The company is brought out without any promotion money whatever, and with a plain statement of the uncertainties of the business, so that the engineers are not at all compromised. The affair, in the present temper of the London market, will go "like hot cakes," and shares will probably go to three or four times their issuing price. When the fit is on the London market will take with avidity a purely speculative thing like these ruby mines, when it won't listen to a moderately profitable but comparatively certain scheme. The mining share here takes the place of the lottery ticket in other countries.

COAL TRADE REVIEW.

New York, Friday Evening, Feb. 29.

Statistics.

Production of Anthracite Coal for week ended February 23d, and year from January 1st.

	1889. Week.	1889. Year.	1888. Year.
Tons of 2240 lbs.			
P. & Read. R.R. Co.....	85,000	863,908	240,665
Cent. R.R. of N. J.....	99,939	755,418	656,994
L. V. R.R. Co.....	145,245	991,657	793,736
D., L. & W. R.R. Co.....	72,721	559,557	1,142,688
D. & H. Canal Co.....	63,071	531,215	721.245
Penna R.R.....	61,420	462,715	549,906
Penna. Coal Co.....	10,435	103,048	241,386
N. Y., L. E. & W.....	25,000	180,994	126,165
Total.....	562,831	4,448,512	4,472,785
Decrease.....	.....	24,273	.....

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:

1884.....	3,670,114	1886.....	4,706,101
1885.....	3,272,747	1887.....	4,208,857

Production of Bituminous Coal for week ended February 23d, and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

	1889. Week.	1889. Year.	1888. Year.
Tons of 2240 lbs.			
Phila. & Erie R.R.....	2,880	14,383	9,869
Cumberland, Md.....	56,665	422,354	460,490
Barclay, Pa.....	1,000	18,878	27,420
Broad Top, Pa.....	8,381	67,946	71,389
Clearfield, Pa.....	52,877	493,593	543,325
Allegheny, Pa.....	16,416	138,469	128,817
Pocohontas Flat Top.....	32,936	222,237	207,170
Kanawha, W. Va.....	27,558	252,764	258,950
Total.....	198,713	1,630,624	1,707,430

WESTERN SHIPMENTS.

Pittsburg, Pa.....	11,148	97,253	118,717
Westmoreland, Pa.....	23,057	266,100	223,613
Monongahela, Pa.....	3,520	24,585	50,368
Total.....	37,725	387,938	392,698
Grand total.....	236,438	2,018,562	2,101,128

Production of Coke on line of Pennsylvania R. R. for week ending February 23d and year from January 1st, in tons of 2000 lbs.: Week, 78,600 tons; year, 689,683 tons; to corresponding date in 1888, 643,501.

Anthracite.

The coal trade is quite dull with the companies, but the individual operators, who are doing practically all the business at present, report a better demand. Prices are the same with them as they have been for some time past; that is, far below the standard quotations, but the increase in orders is encouraging.

At a meeting of the sales agents this week the question of the opening prices for spring were fully discussed. Some of the gentlemen wished to have them named at once and to have them made comparatively low, at least as low as $4 per ton for stove and chestnut coal; others advocated $4.25, while still others, or perhaps another whose experience of the trade is limited but whose confidence is great, thought the present prices, that is, the highest prices of last year should be the lowest price of this year, and that all changes in the coal prices should be upward. No doubt this theory is a very comfortable one for those who have short memories, or whose experience is too brief to dampen their enthusiasm, but the older heads know how this thing works in practice, and are pretty unanimously in favor of bringing the prices down very considerable at the opening of the season, and allowing them to rise from this lowest point. The meeting adjourned without coming to any conclusion, and, in fact, it may have been to enable the over-sanguine element to take a lesson from the experienced. On the 12th inst. the Sales' Agents meet again and will then decide upon the opening prices, which it is expected will be announced on the 15th of March, and which will be either $4 for stove and chestnut coal or $4.25 as last year.

A reference to the weekly reports at the opening of trade last year will show that the price then named was considered too high, and that it delayed the opening of business very considerable, while it actually promoted the cutting of prices. Had the price then been made $4 it is probable that all producers would have lived up to it, while when $4 25 was named the outside producers promptly broke it and went down to $3.75, at which price a considerably amount of stove and chestnut coal was sold. We believe that $4 would be a safer price to open the market at than $4.25, and that it would tend to increase orders early in the season. It is, of course, very well to say that the public has to have the coal, and that if even $4.65 be named as the price, will still have to pay it. The argument would be true if anthracite coal was the only fuel obtainable, and if a few railroad companies owned all the anthracite. This, however, is not the case, and if the past year's prices have turned a good many consumers from anthracite to bituminous the prospect of commencing at the highest point of last year and increasing from that would turn over a great many more; moreover, if the prices at the opening of the season be high there is no inducement for dealers to invest in the coal. They leave the companies to carry the entire season's supply, and it finally crowds the production into a very few month's work.

It is true that the coal trade is, in some respects, in a stronger position now than it ever was before. The consumption is constantly increasing, and the maximum production is not very far above the last year's output, so that the companies can well afford to curtail, knowing that in a few years they will have a market for all that they can produce; moreover, the last year's business of the coal roads and the exceptionally favorable conditions which assisted in the reorganization of the Reading road were very important factors in maintaining prices. It is true, however, that even the reorganized Reading has pretty heavy fixed charges to meet, and that it cannot for any length of time forego a market for its coal, so that if the public should decline to pay the prices and should continue to use up the considerable stocks which the mild winter has left on their hands, it is possible that the patience of those who have to take care of these fixed charges might become exhausted.

The season opens with very good prospects for another heavy year's business. The consumption up to the present time is ahead of last year, and the production may well be stopped for a short time to bring stocks to a healthy state; then, with a moderate opening price, we think the anthracite trade will have fair sailing for the balance of the year, and certainly be able to maintain whatever prices it starts out with, so that consumers can buy with the utmost confidence in the stability of prices and with a certainty of an advance from the opening prices to the close of the season.

The argument in the case of Coxe Brothers & Co. vs. the Lehigh Valley Railroad Company, before the Inter-state Commission, has been postponed until March 14th.

Bituminous.

The feature of the market continues to be dullness, waiting a final signing of the Seaboard Association's "iron-clad" agreement. It was expected that to-day the Beech Creek Company would sign this agreement, and it is hoped that nearly all those who have signed it will stand by its terms. The opening price will be the same as last year, and, as soon as announced, which will probably be in a few days, a considerable number of contracts will be closed. We hear already of the Fitchburg road having closed its contract with John C. Scott & Co. for 60,000 tons. We do not hear of any other large contracts having been made, and from the fact that companies are booking small orders at old prices it would seem that there is little or no undercutting at present.

The Lake Coal Dealers' Association, taking in the bituminous producers of the Pittsburg and Hocking Valley districts, met at Cleveland on the 28th ult., and completed an organization. The combination requires a heavy guarantee fund and a tonnage tax throughout the season of navigation. It will fix prices and control all matters pertaining to the lake coal trade. The business coming under its direction amounts to about three million tons. The heavier dealers in soft coal at Chicago have been induced to co-operate with the producers and shippers.

BOSTON. Feb. 28.

[From our Special Correspondent.]

The anthracite coal market is dull and draggy. Some jobbers report a little inquiry for broken size, and there is a slight movement at from $3.75 to $3.95 f.o.b. at New York for this size. Egg coal is selling at about the same prices when any one is willing to buy. Stove coal ranges from $4.10 to $4.25 f.o.b. Of course these are not company prices, but as good coal can be had at the figures named, or within the range given, it is not fair to quote company prices. Very little coal is moving at any figure beyond those quoted. It was expected by some that opening prices on anthracite would be out this week, but they are not forthcoming as yet.

In bituminous coal the only additional gossip is that

he Fitchburg Railroad have contracted for 50,000 tons coal, water freight, of John C. Scott. It is a little peculiar that all these early, not to say premature, contracts are attributed to this quarter. There are very few buyers in the market, but some little business will be announced as closed just as soon as prices are officially given out. The rumor is that some price lower than $2.60 f.o.b will be named for railroad business. The final particulars will, doubtless, be known in time for publication under the New York market this week.

The decline in freights is noticeable. Vessels and barges may be had from New York as low as 75 cents, and from that to 95 cents. Nothing of any account is coming from Philadelphia, and rates there are nominal at $1@$1.20. From Baltimore come quotations of $1@$1.05, and from Hampton Roads 90c.@$1.

Retail trade is a little better, but rather slack even now, after a cold snap. Combination prices are unchanged.

Receipts for the week have been 14,264 tons anthracite, 4070 tons bituminous, making total for the year 109,904 tons anthracite, 140,785 tons bituminous. I know of no reliable statistics for last year's comparison.

BUFFALO. Feb. 28, 1889.

[From Our Special Correspondent.]

Have heard some of the details of the way by which the coal award of the Grand Trunk Railroad was effected, but as it differs very slightly from the particulars sent you last week and as it would occupy considerable of your valuable space to explain matters, have concluded to let well enough alone and drop the subject.

Many of the anthracite dealers and shippers of our city are in New York with the object of attending the monthly meeting to be held there to-day.

The case of D. S. Bennett and wife against the Delaware, Lackawanna & Western Railroad Company is on trial in the Supreme Court here. The suit grows out of the seizing of the plaintiff's property by commission, in which they obtained an award of $469,375. This property adjoins the coal trestles, etc., of the company, and the rails are laid thereon to enable the cars to reach the said trestles.

On May 1st next the present firm of Messrs. Thomas Loomis & Co. will be dissolved by Mr. Chas. T. Hall resigning therefrom. Mr. A. J. Sherman, for many years with Messrs. A. Langdon & Co., will join Mr. Thomas Loomis on that day and the new firm of coal dealers will be known by the same title as heretofore.

Messrs. Coxe Bros are introducing new machinery and sundry innovations in the method of handling coal at the W. N. Y. & P. docks and trestles. Two buckets, carrying half a ton each, making a round trip, so to say, every minute or less, are a prominent feature of the plan. Bituminous coal only will be operated upon at present, and if success is assured, anthracite will be manipulated in the same way.

Again, an effort is being made to unite vessel owners and propeller line managers in an arrangement to delay fitting out their lake craft before May 1st. It is said the Cleveland men are nearly if not quite unanimous in favor of the plan. Buffalonians will not commit themselves, however, but will take time to consider the matter. As great saving of expense is urged as the foremost reason for the establishment of the scheme, and another is that a short and busy season is more desirable for all persons concerned. One of the line boat managers says that "the time is not ripe yet for a movement of the kind; that it is a good idea, but vesselmen are not educated up to it now; and that the advisability or necessity at present is a matter of theory." However, "nothing venture, nothing win," is the motto of the so-called progressive party.

The Duluth Iron and Steel Company has commenced the construction of a coal and ore dock at West Duluth 1000 feet in length and about 120 feet in width. It is surprising how trade has grown at this Lake Superior port, and how much enterprise is shown in providing facilities for handling the rapidly growing commerce of the Northwest.

PITTSBURG. Feb. 28.

(From our Special Correspondent.)

Coal.—The market continues to drag along slowly. Navigation in the slack water has been resumed. The February coal run did not exceed 3,000,000 bushels. The mines generally are inoperative. The way things look at present another shut-down is not far off. The steamers James A. Blackmore, Samuel Miller, and S. C. Mercer, owned by the Grand Lake Coal Company, were sold. The sum realized was small. Thus one of the best-appointed coal companies between Pittsburg and New Orleans has been closed out.

The nominal rates are:

PRICE OF COAL PER 100 BUSHELS = 7600 LBS.

First pool	$4.75	Fourth pool	$3.25
Second pool	4.50	Railroad coal	5.00
Third pool	3.90		

Connellsville Coke.—Some of the reporters on the daily papers are regular cranks on the subject of a coke strike. Their predictions are like themselves, not of much account. Leading coke men are of the opinion that business will be good at least for some time. The week's production was 108,595 tons against 104,573 tons previous week. Shipments for week 5,800 cars, previous week 6,025 cars.

Nominal rates at the ovens:

Furnace Coke	$1.25@$1.35	Foundries	$1.50
Crushed	2.20		

Freight rates from the ovens to Pittsburg, 70c. per ton; to the Mahoning and Chenango valleys, $1.35; East St. Louis, $3.20; Cleveland, $2.80; Chicago, $2.75.

FREIGHTS.

Pig Iron Freight Rates from Ohio.—The rate on pig iron from the Mahoning and Chenango Valley to all Eastern points was reduced on the 27th ult., at a meeting of the Youngstown Committee of Railroad Freight Agents held at Cleveland this week, and will go into effect at once. The new rate to Boston, Mass., is $4.20 per gross ton; to New York, $3.20; to Albany, Troy and Schenectady, $2.70; to Syracuse, $2.45, and to Rochester, $1.95.

METAL MARKETS.

NEW YORK, Friday Evening, March 1, 1889.

Prices of silver per ounce troy.

Feb.	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.	Feb.	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.
23	4.89	42¾	93½	27	4.89	42⅝	93¼
25	4.89	42¾	93½	28	4.89	42⅝	93¼
				Mch 1			
26	4.89	42⅝	93¼		4.89	42 9-16	93⅛

The silver market has had a stronger tendency this week, but the rate of interest continues high in India, affecting the demand for bars. India exchange is weaker and Council bills were allotted on last Wednesday at 1s. 32d. decline.

The United States Assay Office at New York reports total receipts of silver for the week 69,600 ounces.

Foreign Bank Statements.—The governors of the Bank of England at their weekly meeting made no change in its rate for discount, and it remains at 3 per cent. During the week the bank lost £118,000 bullion, and the proportion of its reserve to its liabilities was reduced from 45·40 to 43·58 per cent, against a decline from 46·78 to 44·90 per cent in the same week of last year, when its rate for discount was 2½ per cent. Thursday the bank gained £25,000 bullion on balance. The weekly statement of the Bank of France shows a loss of 1,025,000 francs gold and a gain of 500,000 francs silver.

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked.
Trade dollars	$ .72	$ —
Mexican dollars	.73	.73¾
Peruvian soles and Chilian pesos	.71	.72
English silver	4.83	4.87
Five francs	.94	.95
Victoria sovereigns	4.86	4.90
Twenty francs	3.87	3.90
Twenty marks	4.74	4.80
Spanish doubloons	15.60	15.75
Spanish 25 pesetas	4.83	4.90
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.65
Ten guilders	3.96	4.00

Copper.—Beyond a considerable amount of discussion on the general position and prospects of the copper market and the expression of different views as to the ability of the syndicate to retain the control of prices, there is absolutely nothing to report in the way of actual business here during the past week. A feeling of uneasiness regarding the whole position is almost universal, and dealers and consumers seem only to be anxious at present to avoid any kind of transaction in the metal, and to wait for further developments. No business whatever has been reported on the Metal Exchange during the week, and quotations may be given as, nominally: Lake Copper, Spot, 16½. March, 16½. April, 16½. Casting copper lower again, 15¼.

In London things have been a little more lively and a fair number of transactions have taken place on the London Metal Exchange and Chili Bars and G. M. B. copper at prices for both spot and futures under the figures reported in our last issue although the decline in the spot quotation has not yet amounted to very much in comparison with the price of futures. Latest cables give the following as the closing prices: Spot £77 10s. to £78 3 months futures, £64 10s. being a decline of about £2 a ton in the week in both spot and futures.

Messrs. Henry R. Merton & Company cable that during the second half of February the statistics of visible supplies again show an increase of 4800 tons making the total increase for the month 8700 tons. On the other hand mail advices from Europe point to the total quantity of refined copper not controlled by the syndicate as becoming comparatively limited and many believe that if the prices can be kept up a little longer, smelters and consumers well be compelled to come in and pay the current rates.

The closing quotations for G. M. B. and Chili bars spot, £75, the reasons given for the decline being that the syndicate are not buyers.

On February 24th it was cabled from Paris that the formation of the Compagnie Auxiliaire des Métaux had finally taken place, that the shares had all been taken by the founders of the company themselves, and 25 per cent of the capital subscribed for of 40,000 000 francs had been paid in. Messrs. Hentsch, Masson and Quiedeville have been appointed managers for six years to come, and Messrs. Danfert and Secrétan auditors. The plan of this company is said to be a capital of 40,000,000 francs. The company is to be authorized to issue 80,000,000 francs of bonds. This would constitute a capital of 120,000,000 francs. But this is not enough, inasmuch as the Société des Métaux insists that the syndicate should authorize an additional issue of 100,000,000 francs in so-called warrant bonds. This issue is proposed to be made by the new company at a suitable moment in order to enable the same to carry the copper monopoly to a safe issue. The total capital to be thus created would consequently finally reach the enormous amount of 220,000,000 francs, which it is true would enable the parties to pay for 110,000 tons of copper and store it away.

The exports of copper from New York during the past week were as follows:

To Havre—	Copper.		Lbs.	
By S. S. La Bretagne	Casks.	190	58,437	$8,780
By S. S. La Gascogne	Sacks.	121	68,563	9,600
To Liverpool—				
By S. S. Britannic	Casks.	20	25,000	4,300
By S. S. C. of Chester	Casks.	112	112,000	17,920
To Liverpool—	Copper matte.			
By S. S. The Queen	Bbls.	127	154,000	9,000
To Bristol—	Old copper.			
By S. S. Exeter City	Casks.	12	13,200	1,591
To Hamburg—	Copper bullion.			
By S. S. Wieland	Bars.	12	716	,105
By S. S. Wieland	Pckgs.	13	750	650

Copper report from James Lewis & Son, dated Liverpool, February 16th, 1889:

Interest during the past fortnight has been chiefly centered in the financial arrangements of the French syndicate; difficulties having arisen in connection with the formation in London of the projected copper bank. It is understood that these difficulties arise from the disinclination of the large mining companies to modify their existing contracts and to reduce their production 25 per cent unless they receive equivalent compensation in price. As present prices are materially affecting consumption and causing the substitution of other metals for copper as well as stimulating the production of the smaller mines, still higher prices would only tend to further decrease the consumption and increase the production of the independent mines.

It is now reported from Paris that a "Compagnie Auxiliaire des Métaux" has been formed there, with a capital of £1,600,000 in shares and £1,609,000 in debentures, to assist the Société des Métaux and the syndicate in financing the large stock of copper they now hold—representing at present an outlay of about £11,000,000. Meanwhile it is stated that a loan of £1,000,000 has been obtained from a London and continental banking house against copper warrants.

Since the 1st inst. the syndicate have received about 4000 tons of good merchantable copper, chief part of which was bought three months ago at £79 per ton; and they have also purchased cash warrants at £77 10s., this price up to £77 15s. being paid by other purchasers who had sales to cover. Of three months' prompt G. M. C. considerable sales have been made at £70 to £69 per ton, and for delivery over the whole year, at seller's option, at £63 to £61 10s. per ton. Consumers are thus able to provide themselves with copper for delivery three months hence considerably below the current price.

Furnace material is very difficult of sale, smelters not being inclined to purchase except at a material reduction in price, although they have sent into the public stocks 2220 tons of English G. M. copper during the fortnight.

Public stocks have accumulated 5847 tons during the fortnight and to 14,112 tons since the first of January. There are now 24,143 tons Anaconda matte in stock.

Imports for the past six weeks are 1284 tons less than for the same period last year, and the deliveries are 7185 tons less.

Arrivals from the United States have been 1798 tons here and in Swansea, and 106 in France, and from Chili 1580 tons here and 305 in France.

Chili charters for the fortnight are 1000 tons, and the closing rate of exchange, 29⅝d., price bars being quite nominal.

Tin.—A firm undertone can be noticed in the tin market, and a fair amount of business is reported at rather hardening prices. Our latest quotations being: Spot, 21·50; March, 21·50; April, 21·50. The better feeling has been maintained in spite of a rather unfavorable return of the statistical position, which, according to Messrs. H. R. Merton & Company's cable just received shows an increase in the visible supplies of 1500 tons. This increase is, however, said to be caused by the shipment from the East Indies of old stocks which have been accumulating there for some time past. The London market is considerably firmer with the following latest quotations: Spot, £95 15s.; three months, £96 10s.

Lead.—The lead market has been dull during the entire week, and very little if any business has taken place at the recently advanced quotation of 3·75. At the close the tone is rather easier again, and spot and near deliveries can be bought at 3·70@3·75½. The London quotation is £12 15s.

The St. Louis Market.—Messrs. John Wahl & Co. telegraph us to-day as follows: Market is a little tamer; the undertone is still firm. Sales during the early part of the week were at 3·50c. Closing quotations for both common and corroding are 3·45c.

Spelter remains steady, but business in the metal is dull, and the demand very slack. We quote prime Western at 4·85.

Antimony is very firm and exceedingly scarce. We quote Hallett's, 12c.; Cookson's, 13¼c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, March 1, 1889.

American Pig.—Our reports from different parts of the country indicate a better tone to the market. This is not noticeable here, at least it has not taken such definite form as to affect prices. As we have many times repeated during the past six months, the statistical position of the metal is very strong and a very moderate general disposition to purchase would promptly increase prices; but it is also true that there is no ground for expecting any immediate considerable increase in consumption, and therefore if an ad-

vance should come it would be due to sentimental rather then business conditions. We continue to quote for No. 1 X, $17 to $18; No. 2 X, $16 to $17, and Forge, $15 to $16 at tide water.

Scotch Pig—There is nothing new in this brand. Prices in Scotland are firm and have an advancing tendency, while prices here remain stationary, with no prospect of an immediate improvement. There is no money in importing Scotch iron at present, and the use of it appears to be destined to cease altogether at an early day.

The general features of the iron market show no improvement here nor do our reports indicate any increase in prices anywhere else, though pig iron is evidently on the cards for an improvement in Pittsburg and some of the Western cities. Manufactured irons of all kinds remain stationery in price without any indication of an immediate advance, and in steel rails the tone is, if possible, worse than it has been. Very little improvement in this article is expected before August. Though there are a good many roads to be built, there are very few that have money, and few of the mills are willing to take bonds in any large quantity on new orders for rails. If the financial market improves so that bonds can be floated readily there will be a considerable demand for rails, but this prospect is not at present a very encouraging one, and we do not look for any very large consumption during the first few months of the year.

In merchant steel the market is still demoralized, and we hear of sales having been made at 2 cents and even below that for spring steel. Machinery steel is said to have been sold in Boston at 1·90c. for large quantities.

Old rails are still held pretty firmly, though we hear of a lot being offered at 23.25 Jersey City, and this figure could probably be shaded.

Spiegeleisen is still quoted at $27.25@$28 for 20 per cent. For other quotations we refer to our usual table of Current Prices on another page.

LOUISVILLE. Feb 25.

[Special report by Messrs. HALL BROTHERS & Co.]

The market under review has been active. Some large orders have been taken for both foundry and mill grades, and at 50 to 75 cents higher than our last review. Buyers were somewhat surprised to see the strength the market had when they actually tested it. There could have been many more large orders booked had the furnaces been disposed to sell at the prices that were ruling a week ago, and for deliveries to suit the buyers, it is evident that the market is in a much more healthy condition. Quotations, which are for cash f.o.b. cars at Louisville, will be found in our list of current quotations.

PHILADELPHIA. Feb. 28.

[From our Special Correspondent.]

The conditions of the iron trade seem to be working in the direction of a hardening of prices, notwithstanding the fact that the current production seems to be fully equal to all present and probable demands. The point in the market is just this, that comparatively few consumers of foundry or forge iron have covered their requirements for the next three or four months. Taking consumers as a rule, it is found that they are carrying stocks only to fill the work in hand. Nearly all say that they have new work in sight or promised, and are expecting to have it on their books during the month of March. Their anticipations are not without foundation, and hence makers of crude iron are looking for a general improvement in demand, and they believe that buyers will not hold back, but cover liberally at whatever prices may rule at that time. There are, of course, authorities in the iron trade who talk in both extremes; some thinking prices will go down, and some saying they cannot help but advance. The plain facts are simply these, that all desirable irons are low in stock, and that prices this week are firmer than a week or two weeks ago. Large makers are not trying to crowd stocks on the market, and are not quite so afraid of the Southern irons as they were. There is less cheap iron being offered although as much as ever is to be had when wanted. There is no business in foreign material at present.

The old stereotyped report is to be made this week regarding blooms of all kinds, but nail slabs are rather dull. The nailmakers themselves are in a better humor over the way things are going, and they have nothing to say excepting that they are "giving nails away as usual," to quote one authority literally. Skelp iron is weak, but not any lower than heretofore. There are parties in the market ready to buy, but will wait a little longer.

The demand for bar iron has fallen off this week for no assignable reason unless it is that customers are expecting cheaper iron on account of wages having dropped at the mills. Muck bars are down again about 50 cents, but those who are making first class bars say that the drop is only on inferior stuff. Wrought iron pipe is not in very active demand, although the mill owners say everything will turn out all right.

The sheet mills are working along about as usual and nothing new is to be added to the monotonous reports of the past few months. No large orders for plate iron have gone to Eastern mills, so far as known, but one very large one is hanging fire to-day. An order for between four and five thousand tons was to have been placed to-day, but will not likely be placed until to-morrow or next week.

Two or three large orders for structural iron are also about coming in, but delays may occur before contracts are closed. A great deal of elevated work is to be undertaken early in the spring, and orders have not been given out for a great deal of it yet.

Steel rails are without any change, and only small orders, mostly for repairing purposes, are coming in. The brokers in old rails have nothing to report. There is nothing doing in scrap worth talking about.

For quotations see our table of current prices on another page.

PITTSBURG. Feb. 28.

[From our special correspondent.]

Raw Iron—The market in this vicinity has stiffened up materially. It looks at this writing as if the situation would be altered, that buyers would change places with sellers and do the traveling. Prices that were current a week ago won't answer at present. Every dealer conversed with reports large increased inquiries, with numerous trial lots out at an advance on last week's figures. The fact is the price of raw irons is entirely too low, and the sooner dealers realize the fact the better. Prices in Pittsburg to-day are below those of any leading city East or West. This ought not to be, for our furnaces are noted for making a superior quality of iron. Prices in the Mahoning and Chenango valleys have advanced 25 to 50 cents per ton. A dispatch was received from a valley furnace refusing $14 for 2000 tons gray forge. This would be equal to $14.75 at Pittsburg. The same furnace refused to sell Bessemer below $16.65. The freight to Pittsburg, 75 cents, would run the cost to $17.40.

Muck bar is firm; $26.50 was refused for 2000 tons. All things taken into consideration, the market presents a far more healthy appearance than for some time past. The day for concession is past. The feeling may be termed steady to firm.

It certainly looks as if the activity and better prices we have been waiting for would soon be along. The way that heavy contracts have been made in the South and East gives evidence that the time has come to load up. The price of mill and foundry irons are materially higher in the East. This ought not to be. Iron and steel made here are the equal of any made in this or any other country.

Coal and Coke Smelted Lake Ore.

2000 Tons Gray Forge	14.25 cash.
2000 Tons Gray Forge	14.25 cash.
1500 Tons Gray Forge	14.25 cash.
1500 Tons Bessemer	16.50 cash.
1000 Tons Bessemer	16.75 cash.
1500 Tons Gray Forge	14.50 cash.
1500 Tons Bessemer	16.75 cash.
500 Tons No. 2 Foundry	15.50 cash.
500 Tons No. 1 Foundry	16.50 cash.
200 Tons No. 2 Foundry	15.75 cash.

Coke, Native Ore.

500 Tons Gray Forge	14.50 cash.
500 Tons Gray Forge	14.30 cash.
500 Tons Gray Forge	14.50 cash.
100 Tons No. 2 Foundry	16.00 cash.
200 Tons Gray Forge	14.50 cash.
300 Tons No. 2 Foundry	15.85 cash.

Charcoal.

150 Tons No. 2 Foundry	22.75 cash.
50 Tons Cold Blast	25.00 cash.
50 Tons Cold Blast	14.50 cash.

Muck Bar.

500 Tons Neutral	27.00 cash.
1000 Tons Neutral March	27.00 cash.
500 Tons Neutral	26.75 cash.

Old Iron Rails.

560 Tons American Ts	22.75 cash.
500 Tons American Ts	23.00 cash.

Steel Billets.

750 Tons Billets	27.75 cash.
350 Tons Billets	28.00 cash.
500 Tons Billets	28.00 cash.

Ferro-Manganese.

200 Tons 80 per cent	58.40 cash.

Steel Wire Rods.

500 Tons American Fives	40.50 cash

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, March 1.

Heavy Chemicals.—This market is still in a depressed condition. The prices current for bleaching powder and caustic soda, although unusually low, do not attract much new business, and the activity reported is largely of a jobbing character. In some quarters more hopeful opinions are expressed, but, on the whole, we are able to record no actual improvement since last week.

Carbonated soda ash, however, continues firm, and while transactions of only moderate proportions are reported, the feeling is strong and spot supplies are light. For 48 per cent fair quotations are: 1·22½@1·25c. in a large way, and 1·30c. for jobbing lots. Caustic soda ash, 48 per cent, is steady at 1·25c., with little business of importance to test values.

Refined alkali, 58 per cent, is in limited supply on the spot, and prices are consequently from at 1·17½@1·20c., and 48 per cent at 1·22½@1 25c.

Caustic Soda.—The restriction in the January and

IMPORTS AND EXPORTS OF METALS AT NEW YORK FEBRUARY 18th TO 26th, 1889, AND FROM JANUARY 1st.

IMPORTS.

Spelter.	Week. Tons.	Year. Tons.
Amer. Metal Co		56
Lamarche's Sons, H		5
Total		61
Corres. date, 1888	25	148
Nickel.	Lbs.	Lbs.
McCoy & Sanders		11,240
Total		11,240
Antimony.	Casks.	Casks.
Total	100	500
Corres. date, 1888	50	755
Tin.	Tons.	Tons.
Amer. Metal Co	28	73
Bidwell & French	17	73
Crooks & Co		60
Daval & Son, John		11
Hendricks Bros	11	41
Lehmarer, S. & Co		22
Muller, Schall & Co	28	196
Naumann, F	1	1
Naylor & Co	28	218
Phelps, Dodge & Co	368	1,057
Pope, J. E., Jr		28
Schmarer & Co		11
Thomsen, A. A		112
Thomsen, D		11
Wheeler & Co		1
Total	481	2,015
Corres. date, 1888	708	1,546
Tin Plates.	Boxes.	Boxes.
American Metal Co.	30	30
Bruce & Cook	4,703	18,110
Byrne & Co., J		2,883
Central Stamp. Co.	3,802	15,986
Coddington & Co	2,135	32,619
Cort & Co., N. L	3,885	13,803
Corbier, F. & S		1,132
Crooks & Co	4,523	15,774
De Milt & Co	52	3,676
Dickerson, V. D	9,461	64,706
G. L. N		72
Iron Clad M. Co		45
Lalance & Grosjean	1,114	5,220
Lombard, Ayres		3,000
Merchan & Co	100	1,731
Mersick & Co	537	1,633
Morewood & Co	559	2,771
Phelps, Dodge & Co	25,197	105,466
Pratt Mfg. Co	1,776	37,679
Sanders Bros		479
Shepherd & Co	1,254	5,521
Somers Bros		569
Thomsen, A. A	4,560	44,346
Wheeler & Co	209	2,518
Whittemore & Co	1,000	3,770
Total	63,778	365,622
Corres. date, 1888	29,208	262,336
Pig Iron.	Tons.	Tons.
Bartlett, N. S		200
Crocker Bros	100	1,000
Crooks & Co	300	400
Martin, W. T		150
Naylor & Co		50
Page, Newall & Co		50
Pope, J. E., Jr		200
Stetson & Co	200	1,000
Walbaum & Co	250	250
Williamson & Co	200	600
Total	950	3,800
Corres. date, 1888	1,160	8,777
Steel Sheets, Billets, Forging, etc.	Tons.	Tons.
Abbott & Co	10	640
Belcher, H. W	13	21
Bowker, C. F	6	35
Carey & Moen		46
Carter, G. F		200
Crenshaw, Hugh		25
Crooks & Co	38	133
Cortis, R. J	77	258
Curran, J		5
Dana & Co	627	3,243
Downing & Co	15	59
Erie Despatch		40
Hugill, Chas	4	57
Ismay, J. B		174
Lalance, & G	15	87
Leng's Sons, J. S		2
Lundberg, G		50
Mersick & Co		5
Milne & Co	14	843
Naylor & Co	930	1,823
Newton & S		10
Oelrich & Co		91
Pierson & Co	20	134
Pilditch, F. S	8	30
Power, C. W	4	14
Prosser, Thos		80
Roebling's Sons		101
Schulze & R		3
Temple & L		2
Wagner, W. F	20	116
Wallace & Co		5
Whitney & W	8	16
Wiel Elie	10	20
Wiell & Co		7
Williams & W	6	81
Wolff, R. H	13	75
Total	1,852	8,571
Corres. date, 1888	10	709
Bar Iron.	Tons.	Tons.
Abbott & Co., J	25	260
Bacon & Co		87
Downing & Co		230
Jacobus, E. G		8
Milne & Co		89
Plenty, John	2	2
Wells, F., & Co	15	15
Total	47	696
Corres. date, 1888	34	1,457
Steel and Iron Rods.	Tons.	Tons.
Abbott & Co., J.	50	382
American S. Co	100	100
Boker, H		3
Carey & Moen	66	224
Crabb & Co., W		5
Dana & Co		1,530
Downing & Co		125
Fuller, D. & T		15
Galpin, S. H		265
Heyn, A	101	357
Lillenberg, N		1
Lundberg, G		56
Lundell, C. G		50
Milne & Co	101	301
Montgomery & Co	16	16
Muller, Schall & C		202
Naylor & Co	975	3,110
Page, N. & Co		99
Roebling's Son		401
Whitney & Co		70
Wolf & Co	398	1,345
Wright, P. & Co		3
Total	1,807	8,660
Corres. date, 1888	1,539	11,790
Old Rails.	Tons.	Tons.
Bowring & A		57
Crossman & Bro		125
Neumark & Gross		1,699
Perkins, C. L		433
Ward & Co., J. E		21
Total		2,335
Corres. date, 1888	102	4,165
Scrap Iron.	Tons.	Tons.
Burgass & Co		162
Funch, E. & Co		397
Spaulding & Co		172
Ward & Co., J. E		20
Watjen, F. & Co	152	152
Total	152	903
Corres. date, 1888	124	1,042
Sheet Iron.	Tons.	Tons.
Coddington & Co	14	156
Total	14	156
Corres. date, 1888	20	194
Charcoal Iron.	Tons.	Tons
Bacon & Co		97
Downing & Co		175
Milne & Co		88
Muller, S. & Co		25
Naylor & Co		20
Page, N. & Co	40	217
Total	40	623
Spiegeleisen.	Tons.	Tons.
Crocker Bros		1,743
Dana & Co	322	1,789
Farris & Co		325
Geisenheimer & Co.	25	25
Jansen, J. A	375	2,490
Naylor & Co	1,347	4,507
Perkins, C. L		101
Walbaum Bros		675
Total	2,069	11,655
Corres. date, 1888	2,483	9,583
Iron Ore.	Tons.	Tons.
Earnshaw, A		526
Total		526
Corres. date, 1888	2,023	5,340

EXPORTS.

Copper.	Pounds.	Pounds.
Abbott & Co	69,113	407,097
Amer. Metal Co	25,000	585,050
Hurst, F. W. J		113,000
Naylor & Co		637,024
Piper, D. & Co		3,898
Seaman, Sam'l H		141,800
Total	94,113	1,887,869
Corres. date, 1888		9,910,452
Copper Matte.		
Abbott & Co		427,613
Amer. Metal Co	154,000	1,730,543
Am. & Paterson		72,220
Henriott, F		5,083,260
Seaman, Sam'l H		13,000
Wil'ms, Terhune		692,494
Total	154,000	8,019,167
Corres. date, 1888		11,103,928

CURRENT PRICES.

CHEMICALS.

Acid—Acetic, ℔ 100 lbs..... 2.00@2.25
Muriatic, 18°, ℔ 100 lbs ... .. 1 15@1.20
Muriatic, 20°, ℔ 100 lbs..... 1.35@1.50
Nitric, 36°, ℔ 100 lbs ... . 4.00@5.50
Nitric, 42°, ℔ 100 lbs..... 5.50@7.00
Oxalic, ℔ 100 lbs..... .9.50@10.50
Sulphuric, 60°, ℔ 100 lbs. ..... 90@95
Sulphuric, 66°, ℔ 100 lbs ..... 95@1.25
Alkali—36 p. c..... .. 1.12½@1.25
48 p. c ..... 1.22½@1.25
Refined, 58°..... 1.15@1.25
Alum—Lump, ℔ lb..... .. 1¾
Ground, ℔ lb.. ..... 1¾@2
Lump ℔ ton, Liverpool £4 17 6
Sulphate of Alumina, ℔ ton.....£4 10
Aqua Ammonia—18°, ℔ lb..... 4¾
20°, ℔ lb..... 6
22°, ℔ lb..... 6@7
26°, ℔ lb..... 10@11
Ammonia—Sul., ℔ 100 lbs... 3.35@3.45
Carb, per lb..... 7½@8
Muriate per lb..... 6½@8
Arsenic—White, powdered, ℔ lb...3@3½
Red. ℔ lb 7
White, at Plymouth, ℔ ton. .. £11 10
Asbestos—Am., p. ton..... $50@$300
Italian, p. ton, c. i. f. L'pool.....£18
Asphaltum—P. ton 13.00
Prime Cuban, ℔ lb .. .. 4½@5½c.
Hard, ℔ ton..... $28.00
Trinidad, refined, ℔ ton..... $30.00
Barytes—Sulph., Am. prime white17.00
Sulph., foreign, floated, p. ton....20.00
Sulph., off color, p. ton 13.00
Carb., lump, f.o.b. L'pool, ton ...£6 5 0
No. 1, casks, Runcorn " "£4 10 0
No 2, bags, Runcorn " " 3 15 0
Bleach—Over 35 p.c., ℔ lb...1.80@1.85
Borax—℔ lb 9¼
Refined at Liverpool, ℔ ton..... £29
Brimstone—*See Sulphur.*
Bromine—℔ lb..... .....37@38
Chalk—℔ ton..... ..... 3.25
Precipitated, ℔ lb. 5
China Clay—English, ℔ ton13.50@18.50
Southern, ℔ ton..... ..... 13.50
Chrome Yellow—℔ lb..... .. 10@25
Cobalt—Oxide, ℔ lb..... .2.60@2.90
Copper—Sulph. English Wks.,ton.....£25
Precip., Eng. Wks, unit....fluctuating
Copperas—Common, ℔ 100 lbs.52@57½
Best, ℔ 100 lbs..... ....75@1.00
Liverpool, ℔ ton, in casks .....£1 15s.
Cream of Tartar—Am. 99%....24@24¾
Powdered, 99 p c..... 24¾@25½
Emery—Grain, ℔ lb 4
Flour, ℔ lb 2½
Feldspar—Ground, ℔ ton..... 16.00
Fuller's Earth—Lump, ℔ bbl. .90@95
Powdered, ℔ lb.. ..... 1¾@2
Gypsum—Calcined, ℔ bbl. 1.25
Iodine—Resublimed..... 3.50
Kainit—℔ ton..... .... 9.75@10.50
Kaolin—*See China Clay.*
Lead—Red, ℔ lb. ..... 6¾@7
White, American, in oil, ℔ lb.... 7@ 7¼
White, English, ℔ lb ....8¼@9
Acetate, or sugar of ..... 12@13
Lime Acetate—Amer. Brown. .95@1.00
" Gray1.75@1.87½
Litharge—Powdered, ℔ lb. .... .6½@6¾
English flake, ℔ lb..... .9@9½
Magnesite—Greek, ℔ ton..... 10.00
Manganese—lump,c.i.f. L'pool 62s. 6d.
Per unit, up or down..... 1s. 6d.
Ground £5 17
Mercuric-Chloride—(*Corrosive Sublimate*) ℔ lb..... 62@64
Mineral Wool—℔ lb..... 2
Mica—In sheets according to size, 1st quality, ℔ lb..... .25@$6 00
Phosphate Rock—S. Carolina, per ton . o. b. Charleston. 5.00@6.00
Ground, ex vessel New York.10.00@10.50
Canadian Apatite, lump, f. o. b. at shipping port, ℔ unit..... —
Phosphorus—℔ lb..... .... 70@75
Plumbago—Ceylon, ℔ lb. .... 4@5
American, ℔ lb..... ..... 5@7
Potassium—Cyanide, ℔ lb.... .30@40
Bromide, ℔ lb..... 33
Chlorate, ℔ lb. ....14½@15½
Carb. ℔ lb. ....4.70@5.50
Caustic, ℔ lb..... ..... 7½@8
Iodide..... .....2.70@2.75
Muriate, ℔ 100 lbs.... ..... 1.82½@1.90
Nitrate, refined, ℔ lb..... 6
Bichromate, ℔ lb .... 11½@12
Sulphate, ℔ 100 lbs. 2 40
Yellow Prussiate, ℔ lb..... 18
Red Prussiate, ℔ lb... ..... 45@45
Pumice Stone—Select lumps, lb. 3¼
Original cks., ℔ lb..... ..... 1¾
Powdered, pure, ℔ lb... ..... 2¼@2½
Pyrites—Non-cupreous, p. unit, s. 5d.
Quartz—Ground, ℔ ton. 16.00
Rotten Stone—Powdered, ℔ lb..3¼@3½
Lump, ℔ lb..... ..... 6@10
Eng., powdered, ℔ ton. £4
Lump, ℔ ton..... ..... £5
Salt—Liverpool, ground ℔ bbl. . 80@85
Turk's Island, ℔ bbl ..... .25@27
Salt Cake—℔ 100 lbs..... .50@57
Saltpeter—Crude, ℔ lb. .... 5@5½
Refined, ℔ lb. .... 6@8
Soda Ash—Carb.,48% 100 lb... 1.25
High test .... 1.12½@1.15
Caustic, 48% 1.25
Soda Caustic, 60% 2 40
" " 70% .....2.15 @2.25
" " 74–5% .....2.15 @2.25
Sal, English, ℔ 100 lbs.... .90 @ .95
Sal, American, ℔ 100 lbs .... .80 @ .85
Nitrate, ℔ 100 lbs..... ....2.32½@2.40
Strontium—Nitrate ℔ lb. ..... 9@9½
Sulphur—Roll, ℔ lb..... .... 4¼
Flour, ℔ lb 2
Crude Brimstone, 2s., ℔ ton.20.00@21.00
Crude Brimstone, 3ds. ℔ ton.19.00@19.25
Talc—Ground French, ℔ lb .. ...1¼@1½
Domestic, ℔ lb ..... ¼
Domestic, ℔ ton..... ..... 15 00
c. i. f. Liverpool, ℔ ton..... .. £4 5 0
Tannin—Pure, ℔ lb. ....
Vermillion—American, ℔ lb... .. 61
English, ℔ lb.. ..... 82@85
Vitriol—(Blue), Ordinary, ℔ lb.. 5¾@6½
Extra, ℔ lb ..... 6½@6¾
Zinc Oxide—Am., Dry, ℔ lb. 4½
Antwerp, Red Seal, ℔ lb..... .....6@6½
Paris, Red Seal, ℔ lb. ....6¾@7
* Spot

BUILDING MATERIAL.

Bricks—Pale, ℔ 1,000 ..... 3.50@4.00
Jerseys, ℔ 1,000.. ..... 6.50@7 50
Hackensacks, ℔ 1000..... .....
Up Rivers, ℔ 1000..... 7.50@7.75
Haverstraw seconds, ℔ 1000... 7.75@8.00
Haverstraw firsts ℔ 1,000. .. 8.00@8.75
Fronts, nominal, ℔ 1000.
Croton..... 14.00@16.00
Wilmington ..... 20.00@21.00
Philadelphia..... ... ... 28.00@29.00
Trenton ..... @28.00
Baltimore..... 37.00@41.00
Building Stone—Amherst freestone, ℔ cu. ft... ..... 95@1.00
Brownstone, ℔ cu. ft. .... 1.00@1.35
Granite, rough, ℔ cu.ft..... . 45@1.25
Granite, Scotch ℔ cu. ft.. .. 1.00@1.15
Cement—Rosendale, ℔ bbl 1.15@1.20
Portland, American, ℔ bbl... 2 15@2.45
Portland, foreign, ℔ bbl... .. 2.10@2.40
Portland, " special brands.2.45@3.75
Roman, ℔ bbl. ..... 2.65@2.85
Keene's coarse, ℔ bbl..... 4.50@6.50
Keene's fine, ℔ bbl..... .. 7.00@9.25
Slate—Purple and green roofing. ℔ 100 ft. ..... 5.00@6.00
Red roofing, ℔ 100 sq. ft.... 15.00
Black, roofing, ℔ 100 sq. ft.. 4.50@5.25
Lime—Rockland, common ℔ bbl... .1 00
Rockland, finishing, ℔ bbl..... 1.20
St. John, com. and finish, ℔ bb'..... .90
Glens Falls, com. and fin., ℔ bbl .80@1.10
Labor—Ordinary, ℔ day..... 1.50@2 00
Masons, ℔ day..... ..... 4.00
Plasterers, ℔ day..... ..... 4.00
Carpenters, ℔ day..... ..... 3.50
Plumbers, ℔ day..... ..... 3.50
Painters, ℔ day..... 2.50@3.50
Stonesetters, ℔ day..... .3.50@4 00
Tilelayers, ℔ day..... 3.50@4.50
Bricklayers, ℔ day..... ..... 4 00

THE RARER METALS.

Aluminum—(Metallic), per lb...$8.50
Arsenic—Metallic, per lb..... 20
Barium—(Metallic), per lb..... .975.00
Bismuth—(Metallic), per lb..... 2.40
Cadmium—(Metallic), per lb... 1.25
Calcium—(Metallic), per oz.....150.00
Cerium—(Metallic) per oz..... .160.00
Chromium—(Metallic), per lb...200 00
Cobalt—(Metallic), per lb..... 6.00
Didymium—(Metallic), per oz..160 00
Erbium—(Metallic), per oz... ...140.00
Gallium—(Metallic), per oz 3250.00
Glucinum—(Metallic) per oz .. 250.00
Indium—(Metallic), per oz..... 158.00
Iridium—(Metallic), per lb..... 650.00
Lanthanum—(Metallic), per oz.175.00
Lithium—(Metallic), per oz..... .160.00
Magnesium—Per lb..... .. 4.50
Manganese—Metallic, per lb... 1.10
Molybdenum—(Metallic), per oz. 6.00
Niobium—(Metallic), per oz.....128.00
Osmium—(Metallic), per lb 640.00
Palladium—(Metallic), per lb...400.00
Platinum—(Metallic), per lb. ..130.00
Potassium—Metallic, per lb... 3.00
Rhodium—(Metallic), per lb....512.00
Ruthenium—(Metallic), per oz.112.00
Rubidium—(Metallic), per oz...200.00
Selenium—(Metallic), per oz.. .. 3.00
Sodium—(Metallic) per lb. .. 3.00
Strontium—(Metallic), per oz...128 00
Tantallum—(Metallic) per oz...144.00
Telurium—(Metallic) per oz.... 9 00
Thallium—(Metallic) per oz..... 3.00
Titanium—(Metallic) per oz.....32.00
Thorium—(Metallic) per oz.....272.00
Tungsten—(Metallic) per lb..... 1.25
Vanadium—(Metallic), per oz..320.00
Yttrium—(Metallic), per oz 144.00
Zirconium—(Metallic), per oz..240.00

METALS.

Aluminum—
Bronze (10%), ℔ lb..... 46c.
Copper—
Lake Ingot, Spot, ℔ lb..... .... 16¼c.
Electrolytic, ℔ lb .... 15½c.
Casting Brands, ℔ lb. .... 15¼c.
Chili Bars, London, ℔ ton £75
Sheet Copper (according to size), ℔ lb..... .....25 @38c.
G. M. B..... £75
Nickel.—
Metallic, per lb..... 46c.
Lead—
Domestic, Common, Spot.... 3·72½c.
Foreign .... 4 75c.
Sheet, ℔ lb, net..... .. 7c.
Pipe, ℔ lb .. .. 6½c.
Tin lined Pipe, ℔ lb..... 15c.
Shot, ℔ 25-lb. bag ..... 1·45c.
Spanish Lead, London.. .... £12 15s.
Tin—
Tin Plates .... 13s. 6d.
Tin Spot in London .... .. £95 15s.
Pig tin, spot in N. Y., ℔ lb.. 21·50c.
Zinc—
Domestic spelter, ℔ lb.... .. 4·85c.
Foreign spelter, ℔ lb... ... 5·75c.
Silesian, ton..... ....£17 17s 6d.
Sheet, American, ℔ lb... .... 6¾c.
Antimony—Hallet's, per lb.... 12c.
Cookson's, per lb.... ..... 13¼c.
Star Antimony..... .... £47
Quicksilver—Per lb..... .. 56@58c.
London, ℔ flask..... ..... £8

IRON AND STEEL.
New York Prices.

American Pig-Iron.—At tidewater.
No. 1 X ....$17.00@$18.00
No. 2 X..... . .... 16.00@ 17.00
Forge ..... 15 50@ 16.00
Scotch Pig—Coltness... $20.50@ .....
Clyde ..... 19 75@$ 0.00
Dalmellington..... 19.25@ 19.50
Summerlee..... .....
Shotts... ..... 20.00@ 20.50
Langloan ..... 20.00@ .....
By Cable to-day to the Metal Exchange:
Scotch Warrants..... 41s. 4d.
Coltness, at Glasgow..... .....51s.
Langloan, at Glasgow..... .....5us.
Summerlee, at Glasgow..... 50s. 3d.
Gartsherrie, at Glasgow.... .....48s. 6d.
Glengarnock, at Aidrossan.....42s.
Dalmellington, at Ardrossan.....44s.
Eglinton, at Ardrossan ... .42s. 6d.
Bessemer Pig—
Foreign, nominally..... .....
Domestic " ..... 15 50@ 16.50
Spiegeleisen—
German, 20 per cent..... .....
English, 20 " " ..... 27.50@ 28.00
" 30 " " ..... 33 00@ 34.00
Ferro Manganese, 80%..... 55.00
Steel Blooms, nominally ....
Steel Billets, " ..... 30.00@ 33.00
Steel Nail Slabs, " ..... 28.00@ 28 50
Steel Wire Rods, " ..... 41.00@ 41.25
Steel Rails—
Heavy sections, at mill.... 28.00@ 28.00
Light " " .... 30.00@ 32.00
Structural Iron and Steel—
Bridge Plate, at mill.. .....2·00c@2·1c.
Angles, at mill ..... 1·90@2·00c.
Tees, at mill..... .....2 40@2 60c.
Steel Angles, at mill.... ....2¼ @2½c.
Beams and Channels, on wharf, 2·8c. base.
Steel Plates—
Tank and Ship, on wharf..... 2¾@2½
Shell, on wharf..... .... 2¾@3
Flange, " ..... 3 @3¼
Fire-Box, on wharf..... 3½@4
Iron Plates—
Common tank, on wharf....2·0@2·2c.
Refined, on wharf.....2·3@2·4c.
Shell, " ....2¼@2 4c.
Flange. " ..... .3·4@3·5c.
Extra flange..... .....3¾@4
Bar Iron—
Refined..... .....1·8@2·0c.
Common ....1·65@1·75c.
Merchant Steel—
American tool ..... 8½@10c.
Special grades..... 13 @20c.
Crucible machinery..... 5 @6c
" spring..... .... 4½c.
Bessemer machinery..... .... 2·0@2·5c
" spring. .. .. 2·7@2·9c.
Cast-Iron Pipe—At works:
According to size..... $25 00@$31.00
Wrought Iron Pipe—nominal—
Butt-Welded, Plain and Tarred, 55% disc: Galv., 45% disc.
Lap-Welded, Plain and Tarred, 65% disc.; Galv., 55% disc.
Boiler Tubes—Per cent disc.....62½%
Rail Fastenings—
Spikes..... ..... 2·1@2·15c. delv'd
Angle Fish-bars..... .1 85@2c.
Bolts and Sq Nuts.....2·9 @3c
" Hex. " .....3·1 @
Wrought Scrap—
Foreign, *ex store*..... @
No. 1 Yard *to vessel*..... 20.50@ 21.50
Cast Scrap .... 15.50@ 16.50
Old Car Wheels..... .. 17.00@ 18.00
Old Rails—Tees ... . 23.00@ 23.50
—Doubles ....@ 25 00
Nails—In car-load lots. ... $1.80@ $2.00
—From store ..... 1.85@ 2.00
Nails .... $1.90 usual discount
Steel Nails..... .. .. .$1.90
Wire Nails..... ..... 2.55
Two per cent off for cash. * At works.

Louisville Prices.

Hot Blast Irons—
So. Coke, No. 1..... .....$15.00@$15.50
" " No. 2..... 14 25@ 14 75
" " No. 3..... 13 25@ 13.75
Mahoning Valley (Lake Ore Mixture) ..... 18.00@ 19.00
So. Charcoal, No. 1..... 17.25@ 17.75
" " No. 2..... 16.25@ 16.75
Missouri Charcoal No. 1.... 18.00@ 18.50
" " No. 2.... 17.75@ 18.00
Forge Irons—
Neutral Coke.... ..... $13.25@$13.75
Cold Short ..... 13.00@ 13.50
Mottled..... 12.25@ 12.50
Car Wheel and Malleable Irons—
Southern (standard brands).$21.50@$22.00
" (other brands)..... 17.50@ 18.00
Lake Superior..... 22.00@ 22 50

Pittsburg Prices.

Coke or Bituminous Pig—
Foundry No. 1..... .....$16.50@16.75
Foundry No. 2..... ..... 1 .50@15.75
Gray Forge No. 3..... ..... 14.50@14.75
" " No. 4.. .. .. 14.25@ .....
White .... 14.25@ .....
Mottled..... ..... 14.25@ .. ..
Silvery .... 16.50@18.50
Bessemer..... ..... 16.75@17.00
Low Phos .... 21.00@21.50
Charcoal Pig—
Foundry No. 1. .... 23.50@24.50
Foundry No. 2..... . 22.00@23.50
Cold-Blast..... ..... 25.00@28 00
Warm-Blast..... ..... 24.00@25.00
20 p. c. Spiegel..... ..... 27.50@28 00
Muck-Bar..... ..... 27.00@27.25
Steel Blooms..... ..... 28.00@.....
Steel Slabs .... 27.50@.....
Steel Crop Ends..... ..... 19.00@19.25
Steel Bloom Ends..... ..... 18.00@18.50
Ferro Manganese, 80%.. .... 58.50@.....
Steel Billets..... ..... 27.50@28.00
Old Iron Rails..... ..... 23.00@23.25
Old Steel Rails..... ..... 18.50@19.50
No. 1 W. Scrap..... ..... 21.00@.....
No. 2 W. Scrap . . .. 18.50@19.00
Steel Rails..... ..... 28.00@.....
" light sections... ..... 28.00@31.00
Bar Iron., nominal..... 1.75@ 1.80
Iron Nails..... 1.95
Steel Nails..... 1.95
Wire Nails..... 2.25

Philadelphia Prices.

Foundry No. 1..... $17.50@18.00
Foundry No. 2..... 16.50@17.00
Gray Forge..... 15.50@15.25
Bessemer Pig..... 20.00@ .....
Steel Rail Blooms..... 29.50 nom
Foreign Bessemer..... 20.00@ .....
Spiegeleisen..... .....@28.00
Scrap, Selected..... 22.00@22.50
No. 1..... 21.00@22 00
Cargo Scrap..... .. .. .. 20.00@21.00
Muck-Bars.. . . . .@27.50
Merchant Iron..... 1.70@ 1.90
Plate Iron..... 1.90@ 2.00
Tank Iron ..... 2.00@ 2.10
Skelp Iron..... 1.75@ 1.80
Angles..... 2.00@.....
Beams and Channels..... .. 2.80@.....
Nails..... .. . . 1.70@ 1.90
Steel Rails..... 27.00@28.00
Old Rails..... 23.50@24.00

STOCK MARKET QUOTATIONS
Baltimore, Md.

COMPANY.	Bid.	Asked.
Atlantic Coal....	1.25@1.30	....
Balt. & N. C.....	.20@ .25	.30
Big Vein Coal...	1.20@1.25	1.50
Conrad Hill	....	.15
Cons. Coal	.25@ .26	.27@ .28
Diamond Tunnel	.35	.45
George's Crk. C.	107	112½@115
Lake Chrome..	.05	.10
North State (Balto.)	.20	....
Silver Valley....	.25@ .35	.40@ .50

Highest and lowest prices bid and asked during the week ending February 28th.

Birmingham, Ala.

COMPANY.	Bid.	Asked.
Ala. Conn. C..	....	$27
Ala. R. Mill Co.	....	$22¾@$100
*Alice Furnace.	$101	....
Bess. Land Co.	$21@$22	$23@$23
Bir. Fur. & Mg.	....	$20
Broken Arrow.	....	$15½
Decat. L. Imp.	$12@$12½	$12¾@$13
DecaturMin. L.	$22	$28
Enterprise Mfg.	....	$9 @$95
*Eureka	$100@$101	$107@$109
Hen. S. & M. Co.	$67½@$95	$70@$100
Mag-Ellen.....	$90	....
*Mary Pratt...	....	$102
††Sloss I. & S....	....	$56
Tenn. C. & I. Co.	$34	$36
*Williamson....	$99¾	....
Woodstock I. Co.	$55	....

Sales during the week ended Feb. 18th.
Decatur L. Imp.....100 shs. $13¾
Henderson S. & M. C....255 shs. $65@$101
* Bonds. †† First mortgage. † Second mortgage.

Pittsburg, Pa.

COMPANY.	H.	L.	Closing.
Bridgewater Gas.	20.00	20.00	20.00
La Noria Mining ..	1.88	1.63	1.75
New York & C. G. C..	40.00	40.00	40.00
Pennsylvaia Gas...	16.00	14 00	16.00
Philadelphia Co...	37.50	37.13	37.25
Pittsburg Gas....	62.50	60.00	60.50
Silverton Mining..	2.00	1.50	1.50
W'house A. B. Co..	121.00	120.00	120 00
W'house B. Co. Lm.	62.50	61.00	61.00
Wheeling Gas....	29.75	28.50	29 00

Highest and lowest prices bid and asked during the week ending February 27th.

Foreign Quotations.

COMPANY.	*London.* Highest.	February 16. Lowest
Alturas Gold, Idaho...	4s. 6d.	4s.
Arizona Copper, Ariz..	18s. 6d.	18s.
Callao Bis, Venz.....	11s.	10s.
Carlisle, N. Mex	7s. 6d.	6s. 6d.
Colorado United, Colo..	4s.	3s.
Columbian, S. A.....	£1 15-16	£1 13-16
Comstock, Utah.....	£1¼	£1⅛
Cons. Esmeralda, Nev..	6s. 6d.	5s. 6d
Denver Gold, Colo....	2s.	1s. 6d.
Dickens Custer, Idaho.	3s. 6d.	3s.
Eberhardt, Nev	2s.	1s.
El Callao, Venezuela....	£3¼	£2¼
Empire, Mont	6s.	5s.
Flagstaff, Utah.....	4s.	3s. 6d
Garfield, Nev.....	14s.	13s.
Gold Hill, N. C.....	2s.	1s.
Ilex, Cal.....	£3⅛	£2⅛
Josephine, Cal	6s.	4s.
Kohinoor, Colo.....	3s. 6d.	3s.
Mason & Barry, Port....	£8⅛	£5⅝
Montana Lt., Mont	£2⅛	£2
New California, Colo...	8s. 6d.	8s.
New Consolidated.....	2s.	1s. 6d.
New Emma, S., Utah...	5s. 6d.	4s. 6d.
New Hoover Hill.....	3s.	2s. 6d.
New La Plata, Colo...	2s. 6d.	2s.
North Mexican, Mex....	7s. 6d.	7s.
Old Lour, Colo.....	£1¾	£1⅛
Pittsburg Cons., Nev...	20s.	17s. 6d
Quebrada, Venezuela...	£3¼	£3
Richmond Con., Nev...	£2½	£2
Ruby & Dunderberg, Nev	3s.	2s.
Russell Gold, N. C.....	3s. 6d.	2s. 6d.
Sierra Buttes, Cal....	15s.	12s. 6d.
Stanly, N. C	4s.	2s.
United Mexican, Mex...	£3⅝	£3⅜
U. S. Placer, Colo.....	6s.	5s. 6d.
Viola Lt., Idaho	7s.	6s.
	*Paris.**	February 14.
Belmez, Spain.....	540.00	540.00
El Callao, Venezuela..	62.50	62.50
Golden River, Cal	410.00	410.00
" " parts.. .	80.00	80 00
Lexington, Mont.	117.50	117.50
" parts.....	5.00	5 00
Rio Tinto, Spain.....	503.75	503.75
Tharsis, Spain.. ...	136.25	136.25

* Francs.

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES

NAME AND LOCATION OF COMPANY.	Feb. 23. H.	Feb. 23. L.	Feb. 25. H.	Feb. 25. L.	Feb. 26. H.	Feb. 26. L.	Feb. 27. H.	Feb. 27. L.	Feb. 28. H.	Feb. 28. L.	March 1. H.	March 1. L.	SALES.
Adams, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Alice, Mont	....	....	....	....	....	....	....	....	....	....	....	....	.....
Argenta, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Bassick, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Belcher, Nev	....	....	....	....	....	....	....	....	....	....	....	....	.....
Belle Isle, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Bodie Cons., Cal.	....	....	....	....	1.60	..	....	....	1 55	....	....	....	650
Breece, Colo	.22	....	....	....	....	....	....	....	....	....	....	....	100
Bulwer, Cal	....	....	....	....	....	....	....	....	....	....	....	....	.....
Caledonia, Dak	....	....	....	....	....	....	2.80	2.75	....	....	....	....	150
Calumet & Hecla	....	....	....	....	....	....	....	....	....	....	....	....	.....
Chollar, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Chrysolite, Colo.	.27	....	.27	....	....	....	.26	....	....	....	....	....	1,100
Colorado Cent'l, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Cons. Cal. & Va., Nev.	8.50	8.25	8 50	....	8 38	....	8.75	8.50	8.63	8.50	8 88	8.75	1,280
Crown Point, Nev	....	....	....	....	6 13	....	....	....	....	....	....	....	100
Deadwood, Dak.	....	....	....	....	1 48	....	....	....	....	....	....	....	100
Dunkin, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Eureka Cons., Nev	....	....	....	....	....	....	....	....	....	....	....	....	.....
Father de Smet, Dak	....	....	....	....	....	....	....	....	....	....	....	....	.....
Gould & Curry, Nev.	....	....	....	....	....	....	....	....	3.15	....	....	....	250
Grand Prize, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Hale & Norcross, Nev	....	....	....	....	....	....	....	....	....	....	....	....	.....
Holyoke, Idaho	.06	....	.06	....	....	....	.06	..	....	....	....	....	700
Homestake, Dak.	....	..	....	....	13.00	12.88	....	....	12.50	12.00	....	....	625
Horn-Silver, Ut.	.91	....	92	.91	.91	....	.92	.90	....	....	....	....	1,300
Iron Hill, Dak.	....	....	....	....	....	....	....	....	.18	....	....	....	200
Iron Silver, Colo.	....	....	....	....	....	....	....	....	3.50	....	....	....	100
Leadville C., Colo.	.12	....	....	....	....	....	....	....	....	....	....	....	700
Little Chief, Colo.	.30	.29	.30	....	....	....	....	....	....	....	....	....	900
Little Pittsburg, Colo	.08	....	.08	....	....	....	.10	....	....	....	....	....	1,400
Martin White, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mono, Cal	....	....	....	....	....	....	....	....	....	....	....	....	.....
Moulton, Mont.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mount Diablo, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Navajo, Nev.	....	....	....	....	....	....	....	....	1.50	1.45	....	....	250
North Belle Isle, Nev	....	....	....	....	....	....	....	....	....	....	....	....	.....
North Star, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Ontario, Ut.	....	....	35.00	....	34. 0	.	34.00	....	....	....	34 50	34.00	303
Ophir, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Plutus, Colo.	1.05	....	1.00	....	1.05	....	1 05	....	....	....	1.00	....	1,500
Plymouth, Cal.	....	....	10.13	10.00	....	....	10.13	..	10.25	....	10.50	10.38	525
Quicksilver Pref., Cal	....	....	....	....	37.88	....	....	....	....	....	....	....	100
" Com., Cal	....	....	....	....	....	....	7.00	....	....	....	....	....	200
Robinson Cons. Colo.	....	....	.50	.49	.48	.47	....	....	....	....	....	....	1,000
Savage, Nev.	3.50	....	....	....	....	....	....	....	....	....	....	....	100
Sierra Nevada, Nev.	3.40	....	3 40	....	3 55	....	....	....	....	....	....	....	500
Silver King, Ariz.	....	....	1 05	1.00	1.00	....	1.05	1.00	1.05	.98	.90	..	1,360
Silver Mg. of L. V.	....	....	....	....	....	....	....	....	....	....	....	....	.....
S nall Hopes, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Standard, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Stormont, Utah	....	....	....	....	....	....	....	....	....	....	....	....	.....
Yellow Jacket	....	....	....	....	4.75	....	....	....	....	....	....	....	100

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Feb. 23. H.	Feb. 23. L.	Feb. 25. H.	Feb. 25. L.	Feb. 26. H.	Feb. 26. L.	Feb. 27. H.	Feb. 27. L.	Feb. 28. H.	Feb. 28. L.	March 1. H.	March 1. L.	SALES
Alloues, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Amador, Cal	1.70	1.65	1.65	.....	1.65	....	1.70	1.65	1.70	....	1.70	....	2,600
American Flag, Colo	....	....	....	....	....	....	....	....	....	....	....	....	.....
Astoria, Cal.	.20	....	.20	....	.20	....	20	....	20	....	.20	....	7,700
Barcelona, Nev.	.80	.79	....	....	....	....	.80	....	.80	....	....	....	1,200
Bechtel, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Best & Belcher, Nev.	....	....	5.00	....	5.50	....	5.70	....	....	....	5.25	....	400
Brunswick, Cal.	....	....	....	....	.14	.12	12	....	.11	.10	.12	....	1,700
Buffalo Iron Min'g.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Bullion, Nev.	1.45	....	....	....	1.55	....	....	....	1.60	....	1.60	....	600
Carupano, Ven.	....	....	....	....	....	....	....	....	....	....	.99	....	100
Cashier, Colo	....	....	....	....	....	....	.05	.04	.04	....	....	....	2,000
Castle Creek, Id.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Colchis, N. M.	2.30	2.25	2.3	....	2.25	....	2 45	2.30	2.50	2.45	2.50	....	1,300
Columbia & Beaver	....	....	....	....	....	....	....	....	....	....	....	....	.....
Con. Imperial, Nev	.70	....	....	....	.75	.75	.75	....	....	....	....	....	3,800
Con. Pacific	....	....	....	....	....	....	....	....	....	....	....	....	.....
Denver City, Colo.	....	....	....	....	.10	....	....	....	....	....	.10	....	3,100
Eastern Oregon	....	....	....	....	....	....	....	....	....	....	....	....	.....
El Cristo, U. S. Col.	1.70	1.50	1.75	1 65	1 80	1.65	1 70	1.55	1 65	1.55	1.65	1.60	4,900
Excelsior, Cal.	....	....	....	....	.56	....	.56	....	....	....	.58	.57	600
Exchequer, Nev.	1.35	....	....	....	1.45	....	....	....	1.40	....	1.40	....	600
Found Treas., Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Hollywood, Cal.	....	....	....	....	....	....	....	....	.03	....	.03	....	5,000
Julia, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Kingst'n & Pemb'ke	....	....	....	....	....	....	....	....	....	....	1 25	....	200
Kossuth, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Lacrosse, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Lee Basin, Colo	....	....	....	....	....	....	....	....	....	....	.70	....	100
Mexican, Nev.	3.65	....	....	....	....	....	....	....	....	....	4.25	....	200
Middle Bar, Cal.	.31	....	.32	....	.31	....	.31	....	.31	....	.32	....	3,000
Moniter, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mutual Sm. & M. Co	1.45	....	1 45	....	1.45	....	1.45	....	....	....	1 45	....	2,000
N. Commonwealth	....	....	....	....	....	....	....	....	....	....	....	....	.....
Oriental & Mil., Nev	.08	....	....	....	....	....	....	....	.08	....	....	....	1,000
Phœnix of Ark.	....	....	.11	....	.12	....	....	....	.12	....	.12	....	1,500
Potosi, Nev	....	....	....	....	....	....	....	....	....	....	2.80	....	100
Proustite, Idaho	....	....	....	....	....	....	....	....	....	....	....	....	.....
Rappahannock, Va	.09	....	.10	.09	.10	.09	09	..	.10	....	....	....	6,700
Santiago U. S. C.	3 50	....	3.50	....	....	....	....	....	....	....	....	....	200
Shoshone, Idaho	....	....	.08	....	.08	..	.08	....	.09	....	.08	....	5,100
Silver Cliff, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Silver Cord, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Silver Hill, Nev	....	....	....	....	....	....	....	....	....	....	....	....	.....
Silver Queen	....	....	....	....	....	....	....	....	....	....	....	....	.....
State Line, 2&3, Nev.	....	....	....	....	....	....	....	....	.03	....	....	....	2,000
Sullivan Con	1.50	1.40	1.55	1 45	1.50	....	1.50	....	1.55	1.45	1.60	1.55	21,400
Sutro Tunnel, Nev	.10	....	....	....	.10	....	.10	....	....	....	.10	....	5,100
" Trust Cert.	.55	....	.56	.55	....	....	.57	....	....	....	....	....	1,700
SylvaniteM. & M. Col	....	....	....	....	....	....	....	....	....	....	....	....	.....
Tornado, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Union Cons., Nev.	....	....	....	....	4.00	....	....	....	3.95	....	....	....	150
United Copper	1 25	....	1.20	....	....	....	1 25	....	1.30	....	1 30	....	1,000

*Ex. dividend. †Dealt in at the New York Stock Ex. Unlisted Securities ‡Assessment paid. Dividend shares sold, 10,583. Non-dividend shares sold, 78,150. Total New York, 93,633

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	Feb. 21.	Feb. 23.	Feb. 25.	Feb. 26.	Feb. 27.	Feb. 28.	SALES.
Atlantic, Mich.	14 00	14.25	14.00	14.25	....	....	180
Bodie, Cal.	....	....	....	....	....	....	.....
Bonanza Developm't	....	....	....	....	....	....	.....
Bost. & Mont., Copper	47 50	49.00	48.00	46.00	44.50	45.00	3,997
Breece, Colo.	....	....	....	....	....	....	.....
Calumet & Hecla.	270	270	268	260	....	280	398
Cataipa, Colo.	....	....	....	....	....	....	.....
Central Mich.	....	....	....	....	....	....	.....
Chrysolite, Colo	....	....	....	....	....	....	.....
Con. Cal. & Va., Nev.	....	....	....	....	....	....	.....
Dunkin, Colo.	....	....	....	....	....	....	.....
Enterprise.	....	....	....	....	....	....	.....
Franklin, Mich.	14.50	14.00	11.50	....	14 38	13.75	14.00	....	14.00	....	14.00	....	815
Hale & Norcross, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Honorine, Utah	....	....	....	....	....	....	....	....	....	....	....	....	.....
Little Chief, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Little Pittsburg, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Martin White, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mono, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Napa, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Ontario.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Osceola, Mich	15.00	13.50	15 00	....	15.00	....	15.25	....	15.50	15.00	15 50	15.00	1,210
Pewabic, Mich.	....	....	5.00	....	....	....	....	....	5.00	....	....	....	188
Quincy, Mich.	....	....	68.00	66.38	....	....	....	....	67 00	66.50	67.00	66.50	148
Ridge, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Sierra Nev., Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Silver King, Ariz.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Standard, Cal	....	....	....	....	....	....	....	....	....	....	....	....	.....
Tamarack, Mich.	....	....	148	144	147	..	142	141	141	140	143	140½	625

NAME OF COMPANY.	Feb 21.	Feb. 23	Feb. 25.	Feb 26	Feb. 27.	Feb 28.	SALES.
Alloues, Mich.	3 50	3 00	....	....	3 25	3.00	....	....	....	....	550
Arnold, Mich.	....	....	....	....	....	....	....	....	....	....	.....
Aztec, Mich	....	....	....	....	....	....	....	....	....	....	.....
Brunswick, Cal.	....	....	....	....	....	....	....	....	....	....	.....
Butte & Boston	....	....	....	....	....	....	....	....	....	....	.....
Canada	....	....	....	....	....	....	....	....	....	....	.....
Cashier, Colo	....	....	....	....	....	....	....	....	....	....	.....
Crescent, Colo.	....	....	....	....	....	....	....	....	....	....	.....
Cusi, N. Mex.	....	....	....	....	....	....	....	....	....	....	.....
Denver City, Colo.	....	....	....	....	....	....	....	....	....	....	.....
El Cristo, W. S. C.	....	....	....	....	....	....	....	....	....	....	.....
Everett	....	....	....	....	....	....	....	....	....	....	.....
Hanover, Mich	....	....	....	....	....	....	....	....	....	....	.....
Humboldt, Mich.	....	....	....	....	....	....	....	....	....	....	.....
Hungarian	....	....	....	....	....	....	....	....	....	....	.....
Huron, Mich.	....	....	....	....	....	....	....	....	....	....	.....
Kearsarge, Mich.	8.00	....	8.25	....	8.50	....	8.25	....	....	....	8.75	....	290
Mesnard, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	.....
National, Mich.	4.00	....	4.75	4 50	4.50	4.50	....	....	....	....	3.50	....	800
Native, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Pontiac	....	....	....	....	....	....	....	....	....	....	....	....	.....
Rappahannock, Va	....	....	....	....	....	....	....	....	....	....	....	....	.....
Rockland	....	....	....	....	....	....	....	....	....	....	....	....	.....
Santa Fe, N. Mex.	1.88	1.69	2.06	2.00	2.06	1.88	2 00	1 94	1.88	....	1.88	....	6,185
Security, Colo	....	....	....	....	....	....	....	....	....	....	....	....	.....
Shoshone Idaho	....	....	....	....	....	....	....	....	....	....	....	....	.....
South Side, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	.....
St Louis Cop.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Sullivan, Dak	....	....	....	....	....	....	....	....	....	....	....	....	.....

Boston: Dividend shares sold, 7,961. Non-dividend shares sold, 7,825. Total Boston, 15,786.

San Francisco Mining Stock Quotations.

COMPANY.	CLOSING QUOTATIONS. Feb. 21.	Feb. 23.	Feb. 25.	Feb. 26.	Feb. 27.	Feb. 28.
Alpha	....	....	....	....	....	....
Alta	2.30	2.30	2.40	2.35	2.05	2.05
Belcher	....	....	....	....	....	....
Belle Isle	.40	.40	....	.35	....	....
Best & Bel.	5.00	5.00	5.13	5.00	5.25	5.25
Bodie	1.55	1.55	1.55	1.55	1,55	1.55
Bulwer	.52	.50	....	.50	.45	.45
Challar	2.95	2.95	2.90	3.00	2 95	2.90
C'm'weal'h	5.00	5.00	5.00	....	5.00	5.00
Con. C. & V	8.25	8.25	8.50	8.00	8.25	8.25
Con. Pac.	....	....	....	....	....	....
Crown Pt.	6.13	6.13	5.75	.....	5.88	5.88
Eureka C.	....	....	....	....	....	....
Gould & C.	2.95	2.95	3.00	3.00	2.95	2.95
Grd. Prize.	....	....	....	....	....	....
Hale & N.	4.10	4 10	4.10	4.20	4.10	4.10
Mexican	3.55	3.55	3.80	3.85	3.75	3.75
Mono	....	....	....	1.05	1.10	1.10
Mt. Diablo	....	....	....	....	....	....
Navajo	1.50	1.50	1.45	1.40	1.40	1 40
Nev. Queen	2.80	2.80	2.75	2.75	2.85	2.85
N. Belle I.	2.60	2.60	....	2.00	2.60	2.60
Ophir	5.75	5.75	6.38	6.00	5.88	5.88
Potosi	2.40	2.40	2.50	2.50	2,60	2.60
Savage	3.30	3.30	3 35	3.25	3 20	3.20
Scorpion	....	....	....	....	....	....
Sierra Nev	3.30	3.30	3.45	3.50	3.60	3.60
Tip Top	....	....	....	....	....	....
Union Con.	3.25	3.25	3.95	4.05	3.80	3.80
Utah	1.40	1.40	1.45	1.50	1.40	1.40
Yellow Jkt.	4.60	4.60	4.45	4.80	4.60	4.60

COAL STOCKS.

NAME OF COMPANY.	Par val. of sh'rs.	Feb. 23. H.	Feb. 23. L.	Feb. 25. H.	Feb. 25. L.	Feb. 26. H.	Feb. 26. L.	Feb. 27. H.	Feb. 27. L.	Feb. 28. H.	Feb. 28. L.	Mar. 1. H.	Mar. 1. L.	Sales.
American Coal.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Buck Mountain Coal.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Cameron Coal & Iron Co	....	33	....	33	....	33½	32⅞	33½	33	34	33½	33⅞	33⅜	5,100
Ches. & O. RR.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Chic. & Ind. Coal RR.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Do. pref.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Col. & Hocking Coal.	100	....	....	....	....	....	....	19½	18⅛	....	....	20⅛	19⅝	600
Col., C. & I	100	35	....	34¾	34½	34	....	34	....	34	32¾	34⅛	....	1,600
Consol. Coal.	100	....	....	....	....	....	....	27	....	....	....	....	....	200
Del. & H. C.	100	....	....	135⅞	....	136⅝	135¾	....	....	135	....	135⅝	135	1,433
D., L. & W. RR.	50	141⅝	141½	141¼	140⅞	141½	141	141⅝	140½	141¼	140⅜	141½	140¼	41,675
Hocking Valley	100	26¼	....	26⅞	26¼	....	....	....	....	....	....	26¼	26	770
Hunt. & Broad Top	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Do. pref	....	....	....	....	....	45½	....	45½	....	45½	....	....	....	602
Lehigh C. & N.	50	....	....	....	....	....	....	....	....	52¼	....	....	....	416
L. high & W. B. Coal	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Lehigh Valley RR.	50	54¾	....	....	....	54¾	....	54⅝	....	54⅝	54½	....	....	495
Marshall Con. Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mahoning Coal	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Maryland Coal.	100	15½	15	15½	....	15½	....	15⅝	15½	....	....	....	....	1,100
Morris & Essex.	100	148½	....	....	....	....	....	....	....	148¼	....	....	....	120
New Central Coal.	100	....	....	....	....	....	....	....	....	....	....	10	....	100
N. J. C. RR.	50	96⅝	96½	96½	96¼	96¼	95½	95½	94¾	95¼	94¾	95½	95⅛	9,252
N. Y. & S. Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
N. Y., Susq. & Western	100	9	....	8¾	8¼	9	8¾	8¾	8⅝	....	....	8¾	8¼	474
Do. pref	100	....	....	33	....	33½	....	32¾	32½	....	....	....	....	1,000
N. Y. & Perry C. & I.	100	31¼	31	31⅛	31	....	....	....	....	30⅝	30½	30⅝	30½	1,200
Norfolk & Western R.R.	100	17¾	17½	17¼	....	17	....	....	....	....	....	....	....	610
Do. pref	50	52	....	52	51⅞	52	....	51¾	51	51¼	51⅛	51¼	....	2,650
Penn. Coal	50	....	....	310	....	....	....	....	....	....	....	....	....	50
Penn. RR.	50	55⅜	55⅛	55⅝	55⅛	55⅝	55¼	55⅛	55¼	55⅝	55¼	....	....	2,585
Ph. & R. RR.**	50	48⅛	47¾	47⅞	46⅞	47¼	46⅞	47½	46¾	47½	46⅞	47⅝	47¼	156,445
Sunday Creek Coal.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Do. pref.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Tennessee C. & I. Co.	100	37¼	36¾	37⅝	36¼	37	36⅜	37	36	37	36⅛	37	36⅛	8,740
Do. Pref.	....	105	....	103	....	....	....	101	99½	101½	....	102½	....	585
Westmoreland Coal.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Wyoming Valley Coal	....	....	....	....	....	....	....	....	....	....	....	....	....	.....

*Washington's Birthday.

**Of the sales of this stock, 46,077 were in Philadelphia, and 110,368 in New York. Total sales, 237,802.

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par	Assessments. Total levied.	Assessments. Date and amount of last.	Dividends. Total paid.	Dividends. Date and amount of last.	
1	Adams, s. L.	Colo.	$1,500,000	150,000	$10	*	....	$555,000	Jan 1887	.15
2	Alice, s. C	Mont	10,000,000	400,000	25	*	....	775,000	Dec. 1888	.06¼
3	Alma Cons., G	Idah.	300,000	30,000	10	*	....	45,000	Dec. 1888	.50
4	Alturas, G	Idah.	1,500,000	300,000	5	*	....	262,500	Jan. 1889	.37½
5	Amy & Silversmith, s.	Mon.		341,419		....	....	247,530	Aug. 1887	1½
6	Atlantic, C	Mich	1,000,000	40,000	25	$280,000	Apl. 1878	520,000	Feb. 1889	$1.00
7	Argenta, s	Nev.	10,000,000	100,000	100	325,000	July 1888	40,000	Feb. 1880	.10
8	Aspen Mg. & S., s. L.	Colo.	2,000,000	100,000	20	*	....	160,000	Feb. 1889	.20
9	Aurora, I	Mich	2,000,000	100,000	10	*	....	155,000	Oct. 1887	1.87½
10	Bassick, G. S.	Colo.	10,000,000	100,000	100	....	....	400,000	Mar. 1884	1.00
11	Belle Isle, s	Nev.	10,000,000	100,000	100	....	....	300,00	Nov. 1880	.25
12	Belcher, G. S.	Nev.	10,400,000	104,000	100	145,000	Feb 1887	15,397,200	Apl 1878	1.00
13	Bellevue Idaho, s. L.	Idah.	1,250,000	125,000	10	2,322,000	Feb. 1889	187,500	Jan 1887	.10
14	Bodie Con., G. S.	Cal.	10,000,000	100,000	100	76,250	Nov 1888	1,295,000	Apl. 1885	.50
15	Bonanza Developm't	C & M	3,000,000	300,000	10	500,000	Sept 1888	135,000	Oct. 1882	.15
16	Boston & Mont, G	Mon.	2,500,000	250,000	10	*	....	520,000	Jan. 1888	3.00
17	Boston & Mont., G.S.	Mon	2,500,000	100,000	25	*	....	40,000	Apl. 1884	.10
18	Breese, S	Colo	,000,000	200,000	25	*	....	400,000	Nov. 1888	2.00
19	Brooklyn Lead, L. S.	Utah	500,000	50,000	10	....	....	2,000	Feb. 1889	.01
20	Bulwer, G	Cal.	10,000,000	100,000	10	80,000	May 1888	127,000	July 1887	.05
21	Bunker Hill & Sull.	Idah.	3,000,000	300,000	10	*	.... .20	175 000	Jan. 1884	.10
22	Caledonia, G	Dak.	10,000,000	100,000	100	505,000	May 1885	150,000	Oct. 1883	.06⅔
23	Calumet & Hecla, C.	Mich	2,500,000	100,000	25	1,200,000	.... .15	72,000	Feb. 1889	.08
24	Carbonate Hill s. L.	Colo.	1,500,000	300,000	10	*	....	31,850,000	Feb. 1889	5.00
25	Carlisle, G	N. M.	1,000,000	200,000	5	....	....	80,000	Apl. 1884	.05
26	Castle Creek, G	Idah.	100,000	100,000	1	....	....	175,000	Dec. 1888	.12½
27	Catalpa, s. L	Colo.	3,000,000	300,000	10	*	....	51,000	Oct. 1883	.03
28	Central, C	Mich	500,000	20,000	25	....	....	270,000	May. 1884	.10
29	Chrysolite, s. L	Colo.	10,000,000	200,000	50	100,000	Sept 1861	1,930,000	Feb. 1889	2.00
30	Colorado Central, s. L	Colo.	2,750,000	275,000	10	*	.... .15	1,890,000	Dec 1884	.25
31	Confidence, s. L	Nev.		24,960		....	....	341,270	Feb. 1889	.05
32	Cons. Cal. & Va., s. L.	Nev.	21 600 000	216,000	100	287,440	Apl. 1887	174,720	Apl. 1889	.50
33	Contention, s	Ariz.	12,500,000	250,000	50	108,000	Jan. 1885	2,656,800	Feb. 1889	.20
34	Cop. Queen Cons, C.	Ariz.	1,400 00	140,000	10	....	....	2,587,000	Dec. 1888	1.00
35	Crescent, s. L. G	Utah	15,000,000	600,000	25	....	....	140,000	Oct 1888	.50
36	Crown Point, G. s.	Nev.	10,000,000	100,000	100	2,825,000	Oct. 1888	228,000	Oct. 1888	.25
37	Daly, s. L	Utah	3,000,000	150,000	20	....	.... .50	11,000,000	Jan. 1875	.03
38	Deer Creek, s. G	Idah.	1 000,000	200,000	5	*	....	937,500	Feb. 1889	2.00
39	Deadwood-Terra, G.	Dak.	5,000,000	200,000	25	....	....	10.0 00	Oct. 1888	.25
40	Derbec B. Grav., G. s.	Cal.	10,000,000	100,000	100	....	....	11,000,000	Nov. 1887	.05
41	Junkin, s. L	Colo.	5,000,000	200 000	25	90,000	Dec. 1881 .10	180,000	May 1887	.10
42	Dunstone, G. s. L	Mont	1,000,000	200,000	5	*	....	360,000	Jan. 1889	.05
43	Eclipse	Colo.	100,000	10,000	10	....	....	6,000	Nov 1888	.03
44	Elkhorn, G. S.	Mont	1,000,000	100,000	10	....	....	20,000	Nov. 1887	.10
45	Empire L't., G	Mont	500,000	100,000	5	50,000	July 1883 .50	170,000	July 1887	.05
46	Eureka Con., G. s. L.	Nev.	5,000,000	50,000	100	600,000	July 1886 1.00	70.500	Oct. 1887	.37½
47	Evening Star, s. L	Colo.	500,000	50,000	10	....	....	4,955,000	July 1888	.25
48	Excelsior, G	Colo.	10,000,000	100,000	100	560,000	Sept 1885 1.00	1,412,500	Nov. 1888	.25
49	Father de Smet, G	Dak.	10,000,000	100 000	100	200,000	Nov 1878 1.00	875,000	Oct. 1880	.25
50	Franklin, C	Mich	1,000,000	100,000	10	220,000	Jun. 1871	1,125,000	Dec. 1885	.20
51	Freeland, G. S. C	Colo.	5,000,000	200,000	25	....	....	800,000	Dec. 1888	2.00
52	Fresno Enterprise, G	Cal.	5,000,000	100,000	50	....	Mch 1883 .10	190,000	July 1886	.10
53	Garfield Lt., G. s.	Nev.	500,000	100,000	5	....	....	110,000	July 1882	.10
54	Golconda, G. s.	Idah.	1,000,000	100,000	10	....	....	85,000	Apl. 1888	.12½
55	Gould & Curry, G. s.	Nev.	10,800,000	108,000	100	4,369,800	Jun. 1889 .30	120,000	May 1888	.90
56	Grand Central, s	Ariz.	1,000,000	100,000	10	....	....	3,326,800	Oct. 1870	10.00
57	Grand Prize, s	Nev.	10,000,000	100,000	100	595,000	Oct. 1886 .25	625,000	Dec. 1882	.25
58	Granite Mountain, s.	Idah.	500,000	500,000	1	*	....	445,000	Mar. 1884	.25
59	Green Mountain, G.	Mont	10,000,000	400,000	25	*	....	100,000	Jan. 1888	.02
60	Hale & Norcross, G. s	Colo.	1,250,000	125,000	10	*	....	5,300,000	Feb. 1889	.25
61	Hecla Con., s. G. L. C.	Nev.	11,200,000	112,000	100	5,086,000	July 1887 .50	212,000	Nov. 1884	.25
62	Hel'a Mg & Red, G. s. L.	Mont	1,500,000	30,000	50	....	....	1,822,000	Aug. 1888	.07½
63	Holmes, s	Mont	3,315,000	663,000	5	*	....	1,272,500	Jan. 1889	.50
64	Holyoke, G	Nev.,	10,000,000	100,000	100	300,000	Sept 1885 .10	197,973	July 1886	.50
65	Homestake, G	Idah.	200,000	200,000	1	....	....	75,000	Apl. 1886	.06
66	Honorine, s. L	Dak.	12,500,000	125,000	100	300,000	July 1878 1.00	27,000	Feb. 1885	.25
67	Hope, s	Utah	500,000	250,000	2	25,000	Jun. 1883	4,343,750	Feb. 1889	.10
68	Horn-Silver, s. L	Mont	1,000,000	100,000	10	*	....	125,000	Sept 1887	.20
69	Hubert, G	Utah	10,000,000	400,000	25	*	....	233,252	Apl. 1888	.05
70	Idaho, G	Colo.	500,000	50,000	10	*	....	4,000,000	Nov. 1884	.25
71	Ideal, s. L	Cal.	310,000	31,000	10	*	....	239 500	Oct. 1885	.50
72	Illinois, s	Colo.	1,500,000	50,000	100	....	....	5,050,000	Jan. 1889	.11
73	Independence, s	N. M.	100,000	100,000	1	....	....	15.000	Oct. 1886	7.50
74	Indian Queen, s	Nev.	10,000,000	100,000	100	340,000	Oct. 1886 .20	25,000	Jan. 1887	.05
75	Iron Hill, s	Dak.	250,000	125,000	2	....	....	225,000	Sept 1879	.25
76	Iron-Silver, s. L	Colo.	2,500,000	250,000	10	126,500	Jan. 1889 .03	368,750	July 1883	.25
77	Jackson, G. s	Nev.	10,000,000	500,000	20	....	....	156,250	Nov 1887	.03
78	Jay Gould	Mont	5,000,000	500,000	10	237,500	Nov 1880	2,400,000	Dec. 1888	.07½
79	Jocuistita, s	Mex.	2,000,000	400,000	5	*	.... .20	50,000	Oct. 1886	.20
80	Jumbo, G	Colo.	2,500,000	250,000	10	....	....	321,000	Dec. 1888	.10
81	Kentuck	Colo.	3,000,000	300,000	10	....	....	1,200,000	Feb. 1886	.02½
82	La Plata, s. L	Nev.	3,000, 00	30,000	100	342,000	Nov 1881 .30	35.000	Oct. 1887	.50
83	Leadville Cons., s. L.	Colo	2,000,000	200,000	10	*	....	1,350,000	Dec. 1886	.05
84	Lexington, G. s	Colo.	4,000,000	400,000	10	*	....	610,000	Sept 1882	.30
85	Little Chief, s. L	Mont	4,000,000	40,000	100	*	....	423,000	Apl. 1887	.05
86	Little Pittsburg, s. L	Colo.	10,000,00	200,000	50	*	....	563,000	Jan. 1885	.05
87	Manhattan, s	Colo.	20,000,000	200,000	100	*	....	800,000	July 1888	3.00
88	Marion Bullion, G	Nev	5,000,000	50,000	100	250,000	Dec. 1887 1.00	1,050,000	Mch. 1880	.10
89	Martin White, s	N. C.	500,000	....	....	....	....	437,500	Feb 1886	.50
90	Mary Murphy, G	Nev..	10,000,000	100,000	100	1,175,000	Jan. 1889 .25	15.000	Jan. 1886	.25
91	Minnesota, C	Colo.	350,000	3,500	100	*	....	140.000	Dec. 1886	....
92	Mono, G	Mich	1,000,000	40,000	25	420,000	Apl. 1886 1 00	175,000	May 1888	.25
93	Montana, Lt., G. s.	Mont	5,000,000	50,000	100	641,000	Sept 1888 .50	1,824,000	Mar. 1876	5.00
94	Morning Star, s. L	Colo.	3,300,000	660,000	5	*	....	12.500	Mar. 1886	....
95	Moulton, s. G	Mont	1,000,000	100,000	10	*	....	2,190,285	Jan. 1889	.25
96	Mount Pleasant, G	Cal.	2,000,000	400,000	5	*	....	775,000	Mar. 1888	.06¼
97	Mt. Diablo, s	Nev.	150,000	150,000	1	*	....	380,000	Dec. 1887	.25
98	Napa, q	Cal.	5,000,000	50,000	100	137,500	Jun. 1880 2.00	150,000	Feb. 1887	.07½
99	Navajo, G. S. C.	Nev.	700,000	100,000	7	....	....	140,000	Jan. 1889	.30
100	New Guston, s	Colo.	10,000,000	100,000	100	485,000	Apl. 1888 .30	200,000	Jan 1889	.40
101	N. Hoover Mill, G. s.	N. C.	500,000	100,000	5	....	....	355,000	Mar. 1889	.10
102	Northern Belle, s	Nev.	800,000	120,000	2½	....	....	100,000	Dec. 1888	.10
103	North Belle Isle, s	Nev.	5,000,000	50,000	100	425,000	Jan. 1884 .30	30.000	Dec. 1885	.50
104	North Star, G	Cal.	10,000,000	100,000	100	350,000	Jan 1889 .50	2,400,000	Apl. 1885	.06¼
105	Ontario, s. L	Utah	1,000,000	100,000	10	....	....	230.000	May 1888	.50
106	Opair, G. s	Nev..	15,000,000	150,000	100	....	....	150,000	Dec. 1888	.50
107	Original, s. C	Mont	10,000,000	100,000	100	....	....	9,875,000	Feb. 1889	.50
108	Osceola, C	Mich	1,500,000	60,000	25	4,109,440	Sept 1888 .50	1,845,800	July 1888	.50
109	Oxford, G	Mich	1,350,000	30,000	25	480,000	Apl. 1876 1.60	123,000	July 1888	1.00
110	Paradise Valley, G. s	Nev	125,000	125,000	1	....	....	1,222,300	Mar. 1889	.05
111	Parrott, C	Mont	10,000,000	100,000	100	57,000	Apl. 1888 .15	38,500	Oct. 1880	1.50
112	Peacock, s. G. C	N. M.	1,800,000	180,000	10	*	....	150,000	Apl. 1887	.02
113	Plutus, G. s. C. L.	Colo.	2,000,000	200,000	10	*	....	354,000	Jan. 1889	.10
114	Plymouth Con., G	Cal.	2,000,000	200,000	10	*	....	80.000	Nov. 1886	.10
115	Quicksilver, pref., Q	Cal.	5,000,000	100,000	50	*	....	20.000	Feb. 1886	....
116	com., Q	Cal.	4,300,000	43,000	100	*	....	2.280.000	Feb. 1889	.10
117	Quincy, C	Mich	5,700,000	57,000	100	....	....	1,555,224	Mar. 1889	.40
118	Richmond, s. L	Nev.	1,000,000	40,000	25	200,000	Dec. 1863	643,867	July 1888	1.50
119	Robinson Con., s. L	Mich	1,350,000	54,000	25	*	....	5,170,000	Feb. 1889	.40
120	Robert E. Lee, s. L	Colo.	500,000	200,000	25	219,939	Mar 1886 .50	4,315,387	Jun. 1887	5.00
121	Rooks, G	Colo	10,000,000	200,000	50	....	.... .50	99,785	Feb. 1886	1.25
122	Savage, s	Nev.	10,000,000	500,000	20	....	....	585,000	Mar. 1888	.50
123	Security L. Mg., Mfg.	Colo.	500,000	50,000	10	....	....	100,000	Dec. 1882	.05
124	Shoshone, G	Idah.	11,200,000	112,000	100	6,486,000	Jan. 1889 .50	61,000	Apr 1885	.50
125	Sierra Buttes, G	Cal.	1,000,000	100,000	10	*	....	4,480,000	July 1869	.40
126	Sierra Nevada, G. s.	Nev..	150,000	150,000	1	....	....	50,000	July 1884	3.00
127	Sierra Nevada, s. L	Idaho	2,225 000	125,500	10	....	....	7,500	Apl. 1883	.01
128	Silver Cord, G. s. L	Jaho.	10,000,000	100,000	100	6,150,000	Nov 1888 .25	1,598,125	Apl. 1888	.12½
129	Silver King, s	Ariz.	1,000,000	1	1	....	....	102,000	Jan. 1871	1.00
130	Silver Mt. of L. V.	N. M.	5,000,000	500,000	10	....	....	20,000	June 1888	.01
131	Silverton, G. s. L.	Colo.	10,000,000	100,000	100	50,000	Jun. 1888 .50	225.000	Nov. 1888	.25
132	Small Hopes Cons., s.	Colo.	500,000	500,000	1	....	....	1,950,000	July 1887	.25
133	Smuggler, s	Colo.	2,000,000	200,000	10	*	....	25,000	June 1888	.05
134	Spring Valley, G	Colo.	5,000,000	250,000	20	*	....	80,000	Nov. 1886	.02
135	Standard, G. s	Cal.	600,000	60,000	10	....	....	3,112,500	Dec. 1887	.20
136	Stormont, s	Utah	200,000	200,000	1	....	....	66,700	Aug. 1889	.25
137	Joseph, L	Mo.	10 000,000	100,000	100	50,000	Oct. 1886 .25	50.000	Jan 1881	.25
138	Surinam, G	D. G.	500,000	500,000	1	25,000	Oct. 1884 .25	8,595,000	Jun. 1888	.25
139	Swansea, G	Colo.	1,500,000	150,000	10	*	....	155,000	Nov 1881	.05
140	Syndicate, G	Cal.	3,000,000	600,000	5	....	....	844.00	Dec. 1887	.20
141	Tamarack, C	Mich.	600,000	60,000	10	*	....	105,000	Nov. 1887	.05
142	Tip Top, s	Mich	10,000,000	100,000	100	38,729	July 1882 .15	9.000	Apl. 1888	.02½
143	Tombstone, G. s. L.	Ariz.	1,000,000	40,000	25	520,000	Apl. 1885 3.0	48,308	Sept 1885	.10
144	United Verde, C	Ariz.	10,000,000	100,000	100	250,000	Sept 1888 .25	640,000	Dec. 1888	5.00
145	Valencia, s	Ariz.	12,500,000	500,000	25	....	....	100,000	Nov 1881	.20
146	Viola Lt., s. L	N. H.	3,000,000	300,000	10	*	....	1,250,000	Apl. 1882	.10
147	Valencia, s	Idah.	150,000	1,500	100	*	....	97.500	Feb. 1884	.20
148	Viola Lt., s. L	Colo	750,000	150,000	5	*	....	37.500	Apl. 1886	2.50½
149	Yankee Girl	Colo	2,500,000	250,000	10	*	....	272,500	Oct. 1888	.37½
150	Yellow Jacket, G. s.	Nev..	12,00000	120,000	100	5,448,000	Dec 1885 .75	1,275,000	July 1887	.10
								2,184,000	Aug 1871	1.50

NON-DIVIDEND-PAYING MINES

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par Value	Assessments. Total levied.	Assessments. Date & am't. of last.	
1	Agassis Cons., s. L.	Colo.	$2,500,000	50,000	$50	*	....	
2	Allouez, C	Mich	2,000,000	20,000	25	$657.000	Jun 1886	1.00
3	Alpha Con., G. s.	Nev.	3,000,000	30,000	100	562.500	Nov. 1888	37½
4	Alta, s	Nev.	10,080,000	100,800	100	2,248,800	Sept 1888	.50
5	Amador, G	Nev.	400,000	200,000	2	*	....	
6	American Flag, s	Cal.	1,250,000	125,000	10	300,000	Jun 1877	.5
7	Anglo-Montana, Lt.	Colo.	600,000	120,000	5	*	....	
8	Appalachian, Lt., G.	Mon.	1,500,000	300,000	5	*	....	
9	Astoria, G	N. C.	200,000	100,000	2	*	....	
10	Barcelona, G	Cal.	5,000,000	200,000	25	*	....	
11	Bechtel Con., G	Nev.	10,000,000	100,000	100	173,500	Jan. 1883	.10
12	Belmont, s	Cal.	1,000,000	100,000	100	735.000	Apl. 1886	.10
13	Best & Belcher, G. s.	Nev.	10,080,000	100,800	100	2,104,990	Jan. 1889	.28
14	Big Pittsburg, s. L.	Nev.	20,000,000	200,000	100	*	....	
15	Bi-Metallic, s	Mon.	5,000,000	200,000	25	*	....	
16	Black Oak, G	Cal.	3,000,000	300,000	10	*	....	
17	Boston Con., G	Cal.	10,000,000	100,000	100	170,000	Nov 1886	.25
18	Bremen, s	N. M	5,000,000	500,000	10	*	....	
19	Brunswick, G	Cal.	2,000,000	400,000	5	*	....	
20	Bullion, G. s	Nev.	10,000,000	100,000	100	4,007,000	Aug. 1888	.50
21	Bye and Bye	Arix.	1,000,000	100,000	10	*	....	
22	Calaveras, s	Cal	500,000	100,000	5	*	....	
23	Carisa, s	Wy.	500,000	100,000	5	*	....	
24	Carupano, G. s. L. C.	Ven.	200,000	100,000	2	*	....	
25	Cashier, G. s	Colo.	500,000	250,000	2	*	....	
26	Cen. Contin'l, G.s.L.	C. & A	2,000,000	200,000	10	*	....	
27	Charles Dickens, G.s.	Idah.	1,250,000	250,000	5	*	....	
28	Cherokee, G	Cal.	1,500,000	150,000	10	*	....	
29	Chollar, s	Nev.	11,200,000	112,000	100	1,428,000	Oct. 1888	.50
30	Cleveland, T	Dak.	1,000,000	500,000	2	*	....	
31	Coichis	N. M.	500,000	50,000	10	*	....	
32	Comstock, G. s	Nev.	10,000,000	100,000	100	30 000	Mar. 1887	.15
33	Con. Imperial, G. s.	Nev.	5,000,000	50,000	100	1,800,000	Nov. 1888	.05
34	Con. Pacific, G	Cal.	6,000,000	60,000	100	186,000	F b. 1889	.15
35	Cons Silver, s	Mo...	2,500,000	250,000	10	*	....	
36	Courtlandt, s	Colo.	500,000	50,000	10	*	....	
37	Crescent, s. L	Colo.	3,000,000	300,000	10	*	....	
38	Crocker, s	Aris.	10,000,000	100,000	100	105,000	Feb. 1888	.25
39	Crowell, G	N. C.	500,000	500,000	1	*	....	
40	Dahlonega, G	Ga...	250,000	250,000	1	*	....	
41	Dandy, s	Colo.	5,000,000	500,000	10	990.000	Mar. 1886	1.00
42	Dardanelles, G	Cal.	1,000,000	250,000	4	*	....	
43	Decatur, s	U.S.C	1,000,000	500,000	2	*	....	
44	Denver City, s. L	Colo.	1,500,000	300,000	5	*	....	
45	Denver Gold, G	Colo.	5,000,000	500,000	10	*	....	
46	Durango, G	Colo.	300,000	60,000	5	*	....	
47	Eastern Dev. Co., Lt.	Colo.	500,000	500,000	1	*	....	
48	El Cristo, G. s	N. S.	1,500,000	150 000	10	990.000	Mar. 1886	1.00
49	El Dorado, G	U.S.C	1,000,000	500,000	2	*	....	
50	El Talenco, G	Cal.	1,000,000	250,000	4	*	....	
51	Empire, s	U.S.C	1,000,000	500,000	2	*	....	
52	Eureka Tunnel, s. L.	Utah	10,000,000	100,000	100	*	....	
53	Exchequer	Nev..	10,000,000	100,000	100	*	....	
54	Found Treasure, G.s.	Nev.	10,000,00	100,000	100	*	....	
55	Gogebic I. Syn., I	Nev..	10,000,000	100,000	100	790.000	Sept 1888	1.20
56	Gold Cup, s	Wis.	5,000,000	200,000	100	18,030	July 1888	1.06
57	Golden Era, s	Colo.	500,000	200,000	25	*	....	
58	Gold Placer, G	Mon.	2 000,000	200,000	1	*	....	
59	Gold Rock, G	Colo.	5,000,000	200,000	10	*	....	
60	Goodshaw, G	Cal.	1,000,000	500,000	25	229,314	Dec. 1885	.25
61	Grand Belt, G	Cal.	10,000,000	100,000	2	*	....	
62	Grand Duke	Tex.	12,000,000	120,000	100	*	....	
63	Great Bemance, G	Colo.	800,000	80,000	100	*	....	
64	Gregory-Boncau, G	U.S.C	1,000,000	500,000	10	*	....	
65	Gregory Con., G	Colo.	550,000	550,000	2	*	....	
66	Harlem M. & M. Co. G	Mon.	3,000,000	300,000	1	*	....	
67	Head Cent. & Tr. s. G	Cal.	1 000,000	200,000	10	*	....	
68	Hector, G	Aris.	10,000,000	100,000	100	*	....	
69	Highland, C	Cal.	1,500,000	300,000	5	*	....	
70	Hollywood	Mich	500,000	25,000	20	*	....	
71	Hortense, s	Cal.	200,000	100,000	2	*	....	
72	Huron, C	Colo.	2,000,000	200,000	10	*	....	
73	Iron Gold & Silver, s	Mich	1,000,000	40,000	25	280,000	May 1887	3.00
74	Ironton, I	N. M.	2,000,000	200,000	10	*	....	
75	Iroquois, C	Wis.	1,000,000	40,000	25	*	....	
76	J. D. Reymert	Mich	1,250,000	50,000	25	*	....	
77	Julia Cons., G. s.	Aris.	10,000,000	100,000	100	*	....	
78	Kearsarge, C	Nev..	11,000,000	110,000	100	*	....	
79	Lacrosse, G	Mich	1 250,000	50,000	25	1,660,000	Jan. 1889	.10
80	Lee Basin, s. L	Colo.	1 000,000	100,000	10	190,000	Oct. 1887	1.00
81	Lucerne, s	Colo.	5,000,000	500,000	25	*	....	
82	Mammoth Bar, G	Colo.	5,000,000	500,000	10	*	....	
83	May Belle, G	Cal..	10,000,000	100,000	10	*	....	
84	Mayflower Gravel	Cal..	10,000,000	100,000	100	50,000	Dec. 1888	
85	Medora, G. s	Cal..	1,000,000	100,000	100	84,000	Mar. 1884	.15
86	Mexican, s. s	Dak.	250,000	250,000	10	485,000	Jan 1889	.50
87	Middle Bar G	Nev.	10,000,000	100,000	1	*	....	
88	Mine & Starr, s. L	Cal..	450,000	200,000	100	2,725,760	Aug 1888	.25
89	Monitor, G	Colo.	1,000,000	200,000	5	*	....	
90	Moose Silver, s	Colo.	100,000	100,000	1	*	....	
91	Mutual Mg. & Sm.	Colo.	3,000,000	300,000	10	*	....	
92	Native, C	W'sn	10 0,000	100,000	1	*	....	
93	Neath, G	Mich	1,000,000	40,000	25	*	....	
94	Nevada Queen, s	Colo.	1,000,000	100,000	10	*	....	
95	New Germany, G	Nev.	10,000,000	100,000	100	180,000	Dec. 1888	.50
96	New Pittsburg, s. L	N. S.	100,000	100,000	1	*	....	
97	North Standard, s	Colo.	2,000,000	200,000	10	*	....	
98	Noonday	Cal..	19,000,000	100,000	100	20,000	Nov	
99	Oneida Chief, G	Cal.	600,000	60,000	10	208,000	Dec. 1881	.10
100	Oriental & Miller, s.	Nev..	500,000	125,000	100	*	....	
101	Osceola, G	Nev..	10,000,000	400,000	25	*	....	
102	Overman, G. s	Nev.	5,000,000	50,000	100	*	....	
103	Park, s	Utah	11,250,000	600,000	10	*	....	
104	Peer, s	Aris.	2,000,000	115,200	100	3,765,860	Jan. 1889	.25
105	Peerless, s	Aris.	10,000,000	100,000	10	*	....	
106	Phenix,	Aris.	10,000,000	100,000	100	145.000	Jan. 1889	.10
107	Phenix, G. s	Aris.	500,000	500,000	100	345.000	Apl. 1888	.25
108	Phenix Lead, s. L.	Ark.	5,000,000	200,000	100	*	....	
109	Pilgrim, G	Colo.	100,000	100,000	1	*	....	
110	Potosi, s	Cal.	600,000	300,000	2	*	....	
111	Proustite, s	Nev..	11,200,000	112,000	100	1,349,600	July 1888	.50

February production of this article is as ineffectual as ever, so far as preventing a gradual shrinkage of values is concerned. This week we hear of sales of various quantities of high test at prices ranging from 2·10c. to 2·15c. Sixty per cent is quoted at 2·37½@2·40c., and is nominal at that.

English sal soda has recovered a little in price in the absence of any large offerings, and may be quoted ·90@1c., according to quantity and brand.

Bleaching powder has improved neither in price nor in position, the oversupply on the market being an insurmountable obstacle to any improvement. As noted in our last report, Liverpool quotations are £7 7s. 6d., and on the spot as low as 1·70c. would be accepted.

Acids.—The advance in muriatic reported last week was confined to a few manufacturers, and this week we get a little easier quotations, say 1·20c. for 18 degrees and 1·30c. for 20 degrees. We do not hear of much offering, however, and these prices may fairly be written firm.

Nothing better than former quotations is attainable for nitric. Acetic shows no animation at 2c. The combination maintains prices firmly for oxalic acid at 9½@10½c. per lb., depending upon quantity, for prime English and German makes, either ex-store or dock. Sulphuric acid is steady, although we hear of nothing "big" in the way of business. In a large way ·95c. for 66 degrees is asked. We learn that the company, whose works were recently burned, is making good progress with its new buildings, and hopes to have the muriatic plant running shortly. At the office of the company to-day it was denied that the loss would cripple the concern financially. It was further stated that the company will hereafter operate its sulphuric plant instead of leasing it, as has been the custom formerly.

Fertilizers, etc.—The market for these articles is quiet, but prices are well sustained. A reasonable price list should stand about as follows, subject, of course, to the usual variations, depending upon seller, buyer, quantity, date of delivery, terms of payment, etc: Azotine, $2.75; dried blood (city), low grade, $2.65@$2.70 per unit; Western, high grade, $2.75 per unit for ground material; tankage, high grade, $25@$26 per ton; low grade, $24 per ton, as to quality. Fish scrap $25@$26 per ton f.o.b. factory. Sulphate of ammonia, $3.35@$3.40 per cwt.

Refuse bone-black, guaranteed 70 per cent phosphate, is quoted at $19.50 per ton. Dissolved bone-black is 95c.@$1 per unit for available phosphoric acid, and acid phosphate 85@90c. per unit for available phosphoric acid.

Steamed bones, unground, $19.50; ground, $25@$26.

Charleston rock, undried, $5@$5.25 per ton; kiln dried, $6@$6.25 per ton, both f.o.b. vessels at the mines. Charleston rock, ground, is held at $10@$10.50 ex steamer at New York.

Muriate of Potash.—No further arrivals are reported and prices continue firm. We quote on the spot 1·82½@1·90c., and 1·82½@1·85c. to arrive, according to position.

Double manure salts are scarce, and prices are steady at 1·20c. spot on a 48 per cent basis. High grade sulphate of potash is worth 2·35@2·40c. spot, and 2·50c. to arrive, on a basis of 90 per cent potash.

Kainit.—The demand this week has been very light, but as there is very little on the spot, the quotation of $10.50 in this position is continued. For arrivals, $9.75 per ton is asked.

Brimstone appears to be rather weak at $20@$20.50 for best unmixed seconds on spot, and $19.25@$19.50 for thirds.

Nitrate of soda is firm at 2·35@2·40c. spot and 2·15@2.25c. to arrive, according to position.

Among the miscellaneous articles, borax is quoted steady at 9@9¼c. for city refined and powdered, concentrated being held at 7¾@8¼. Acetate of lime is in light request at 95c @$1 for brown and 1·80@1·90c. for gray. Alum is reported in good demand, with prices firm for both lump and ground. Arsenic is held at 7c. for red.

Liverpool. Feb. 16.

[From our Special Correspondents.]

Chemicals.—Messrs. J. P. Brunner & Co. write us as follows: Trade in chemicals still keeps very slack, but manufacturers are expecting to see an improved demand very soon now. Soda ash is nominally unchanged, but there are very few sellers, most makers being busy on orders booked some time ago. We quote on the spot: Caustic ash, 48 per cent, 1d. to 1 1/16d.; high test, 1d. to 1 1/16d.; carb. ash, 48 per cent, 1d. to 1 1/16d.; high test, 1 1/32d. to 1 1/16d. Soda crystals are in light request and £2 10s. nominal quotation for early delivery. Caustic soda: A further restriction in make of 5 per cent has been ordered for this month, making 30 per cent in all, and there has been rather more inquiry the last day or two. Some forced sales of 70 per cent have been made this week by resellers at £6 12s. 6d. to £6 13s. 9d., and at the moment there is nothing offering at under the higher figure, while makers hold for £6 17s. 6d. to £7. Sixty per cent is in small compass and quoted at £5 17s. @£6; 74 per cent we quote £7 5s @£7 7s. 6d., and sales of 76 per cent reported at £8 10s. There is a good inquiry for forward delivery, but buyers want to get on at prices that makers decline to accept. Bleaching powder very dull at £7 10s.@£7 12s. 6d., but buyers are not inclined to operate even at the lower figure, at the same time there is very little offering at present for February delivery. Chlorate of potash in a languid state at 5½@5½d. Bi-carbonate of soda in fair demand at £4 12s. 6d.@£4 15. per ton for one cwt. kegs, according to brand and quantity. Sulphate of ammonia has rallied this week, and a good business done in good gray 24 per cent minimum at £12 5s.@£12 6s. 3d. per ton.

Minerals.—George G. Blackwell writes as follows: Our market has fully maintained its firmness, in fact, most minerals have experienced, as anticipated, a further advance. Manganese: Further arrivals have taken place this week, but all has gone into consumption, and prices have considerably advanced. Magnesite: Raw lump unchanged; raw ground, £6 10s., and calcined ground, £10@£11. Bauxite is in increased demand, especially for the Irish Hill brand—20s. for lump; seconds, 15s.; thirds, 12s.; ground, 25s. Dolomite, 7s. 6d. per ton at the mines. French Chalk: No arrivals to report this week; stocks are small, and prices firm—95s. for medium, 100s.@105s. best G. G. B. Barytes (carbonate) firm. Selected crystal lump scarce at £6 5s.; No. 1 lumps, 90s.; best, 82s. 6d.; seconds, and good nuts, 75s.; smalls, 50s.@60s. best ground, £6 5s., and selected crystal ground, £8 10s. Sulphate in demand; best lump, 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground, best white, G. G. P. brand, 60s.; common, 45s.; gray, 32s. 6d. to 40s. Pumicestone continues in request at the advanced quotations, ground being quoted at £10; and specially selected lump, finest quality, £13. Emery stone of good quality in fair request at £5 5s. to £5 15s. for lump; and smalls, £5. Fullers' earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Asbestos: Best rock £17 to £18; brown grades, £14 to £15. Limespar: English manufactured, old G. G. B. brand, brings full prices; 45s. for ground English; German, 50s. Plumbago: Best Ceylon lump, £25 to £35; good, £20 to £21; chips, £8 to £16; best ground, £20, £25 and £30; Italian and Bohemian, £4 to £12 per ton. Ferro manganese firm at last quotations, also spiegel and chrome pig. Bitumen, finest picked, £35; original prime, £18 to £23, and good £8. Ground mica, £50. China Clay: Fair business doing—common, 18s. 6d.; good medium, 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn). Irish moss scarce, and prices are stronger—common, n10; medium, £12; best, £14."

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, March 1.

The inclement weather of the past week has interfered with considerable building that has been going on in this vicinity for the greater part of the winter, and, consequently, the demand for building material is less urgent. On the other hand, supplies are not here in sufficient quantity to create a depression, and although receivers may not be able to dispose of their stock quite as quickly as heretofore, they are not at all inclined to push sales or to make concessions, because it is believed that the unusual amount of material consumed this winter will create something of a scarcity just before the opening of the regular spring season, and a hardening of prices will ensue.

Bricks.—Both Jerseys and Long Islands may be had in moderate quantities at about $7 for the former and $7.50@$8 for the latter. The demand for the past few days has not been large. Prices, however, may be written firm.

Lime is more strongly situated. The demand continues as steady as last reported, and arrivals are far below what could be easily disposed of. It was estimated that at one time this week there was an unsupplied demand for nearly thirty thousand barrels. Prices, of course, are very firm.

Building Stones.—Last week, in this column, mention was made of the constantly increasing use of lighter and more fancy stones in place of the time-honored brownstone for residences. Of these newcomers, the Indiana limestone is favorably spoken of because of its durability. For the same reason, there has arisen a demand for the Belleville brownstone. This stone, however, is hard to cut, and therefore distasteful to stone cutters, and is also in short supply, the capacity of the quarries being greatly below the existing demand. The imported sandstones, both English and Scotch, are also coming into the market, but, of course, do not wear so well here as in their native country and climate. The Euclid stone, when new, is handsome, and therefore has a claim upon popular favor. It is asserted, however, that this stone, coming as it does from an oil region, is permeated with oil, and in warm weather is liable to discoloration. Bricks, particulary yellow and buff, are also meeting with not a little favor. The old red brick, with terra cotta trimmings, has been used for one of the largest of the city's buildings, and although its appearance has been variously criticised, it is admittedly durable, which should be a *desideratum*.

Horsford's Acid Phosphate,

A Healthful Tonic.

Used in place of lemons or lime juice it will harmonize with such stimulants as are necessary to take.

FOR SALE.

WESTINGHOUSE ENGINE,

Fifteen-Horse Power, and

UPRIGHT BOILER,

Twenty-five-Horse Power, in good order. Owing to enlargement of sampling works and the necessity for greater power, we will sell the above cheap. On cars Erie R. R.

LEDOUX & CO.,
10 Cedar St., New York.

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DIVIDENDS.

ASPEN MINING AND SMELTING COMPANY, No. 54 Wall street,
NEW YORK, Feb. 12, 1889.

Dividend No. 4 of TWENTY CENTS PER SHARE has this day been declared on the stock of this company (200,000 shares), payable at the office of the company on and after the 15th day of February, to stockholders of record. The transfer-books will be closed on Wednesday, February 13th, at three o'clock P.M., and reopened on Saturday, February 16th, at nine o'clock A.M.

J. L. TILTON, Secretary.

DALY MINING COMPANY, MILLS BUILDING, 15 BROAD STREET,
NEW YORK, Feb. 20, 1889.

DIVIDEND NO. 24.

A dividend of TWENTY-FIVE (25) CENTS PER SHARE has been declared for January, payable 28th instant. Transfer-books close 23d instant.

LOUNSBERY & CO.,
Transfer-Agents.

DESK ROOM TO RENT in office down town, suitable for Mining Engineer or Architect, with use of drafting room. Address J. F. C., care of ENGINEERING AND MINING JOURNAL.

A FIRM IN GERMANY WISHES CONnections with firms which furnish mines with safety lamps. Address H. K., No. 50,
Care R. Mosse,
Dortmund, Germany.

ALSEN'S PORTLAND CEMENT.

POUGHKEEPSIE BRIDGE, UNION BRIDGE CO., Oct. 10, 1887.

"In our tests to day a sample of Alsen's mixed neat broke at 935 lbs., the highest we have ever known; it was a 30 day test. Very truly yours,

J. F. O'ROURKE, Engineer in Charg

Alsen's Portland Cement Works,
"Post Building," 18 Exchange Place, N. Y.